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NATIONAL ESTUARINE POLLUTION STUDY. PROCEEDINGS OF THE FLORIDA PUBLIC MEETING HELD AT ORLANDO, FLORIDA ON MARCH 12, 1968. VOLUME I.

Federal Water Pollution Control Administration
Atlanta, Georgia

March 1968

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CLEAN WATER

....FOR THE NATION'S ESTUARIES

PROCEEDINGS OF THE
FLORIDA PUBLIC MEETING
ORLANDO, FLORIDA
MARCH 12, 1968

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VOLUME 1 of 3

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PROCEEDINGS

of the

FLORIDA PUBLIC MEETING

- - -

NATIONAL ESTUARINE POLLUTION STUDY

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

March 12, 1968

Park Plaza Hotel
Orlando, Florida

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FLORIDA PUBLIC MEETING

NATIONAL ESTUARINE POLLUTION STUDY

FEDERAL WATER POLLUTION CONTROL ADMINISTRATION

Park Plaza Hotel Orlando, Florida

March 12 - 13, 1968

TUESDAY MORNING SESSION
March 12, 1968

- - -

The public meeting directed toward obtaining contributions from Florida interests regarding the National Estuarine Pollution Study being conducted by the Federal Water Pollution Control Administration convened in the Granada Room of the Park Plaza Hotel, Orlando, Florida, Tuesday morning, March 12, 1968, and was called to order at 9:00 o'clock a.m. by Regional Director John R. Thoman, Southeast Region, Federal Water Pollution Control Administration.

MR. JOHN R. THOMAN: Would you all please stand for just a moment for a short prayer.

Oh Lord, Who does bless them who bless Thee and does sanctify them who trust in Thee, save Thy people and bless our inheritance. Give peace to Thy world, to Thy churches, to our government and to our armed forces and to all Thy people.

For every good and perfect gift is from above and come down from Thee, oh Father of Lights; and to Thee do we render glory, thanksgiving and worship now and always and forever and ever. Amen.

I am John R. Thoman, Regional Director of the Southeast Region for the Federal Water Pollution Control Administration in the Department of the Interior, and I want to welcome you to the third public meeting in the country held to gather information for the National Estuarine Pollution Study.

Other meetings have been held in Mississippi and Georgia. Most of you already know the specific reasons and purposes for this meeting.

For some of those who may not, let me summarize them briefly. The National Estuarine Pollution Study was authorized under the Clean Water Restoration Act of 1966.

In that Act, the Congress directed the Department of the Interior to make a comprehensive study of pollution problems in coastal and estuarine areas and to report to the Congress recommendations for future management programs.

This study is to be completed and submitted by November of 1969. We in the Southeast Region here are the first to conduct public meetings for the study to obtain the views and opinions of public and private groups and individuals who have an interest in the use of Florida's estuarine and coastal waters.

We will not be hearing today from our sister federal agencies nor from the state agencies. The federal agencies will submit their statements later, and the state agencies will make brief statements together.

We are interested today in mainly obtaining public views and opinions. Many of you were invited to appear here today and to make statements, however, that does not mean that any person may not make a statement or may not express his views.

Anyone who desires to make a statement should let the ladies know at the registration desk, if you have not already done so, and we will put you on the program as quickly as possible.

We are cooperating today with the State of Florida in holding this meeting. Governor Kirk has designated Mr. Nathaniel Reed of his staff to represent Florida's interests.

Mr. Reed and Senator Hodges will be flying in a little later this morning, following a Cabinet meeting.

The panel that we have here is not interrogatory or an adversary group. We are merely attempting, or will attempt, to elicit additional information, clarify views and so forth from those of you who present the testimony.

On our panel we have Mr. John Wakefield, a native Floridian, in charge of comprehensive planning in the regional office of the FWPCA in Atlanta. He is the former Director of the Division of Water Resources in the State of Florida.

Next we have Mr. Vincent Patton, the Acting Director of the Florida Air and Water Pollution Control Commission.

On my right, Mr. Eugene Jensen is from our Washington headquarters and is in charge of the National Estuarine Pollution Study.

Mr. Wakefield will be replaced from time to time throughout the meeting by Dr. H. Page Nicholson of our research group in Athens. Dr. Nicholson is an international authority on the occurrence of pesticides in waters, and for any of you who may present testimony in that regard, I know that Dr. Nicholson will be most interested.

Now, if you will please keep in mind, this meeting is not ours, it is yours. We are here to listen and to learn, and what you say is important. It will be included in the report to Congress.

It will help us, and ultimately help the Congress to determine the various beneficial uses of our invaluable estuarine and coastal waters, their interrelationships and the plan for their uses so that the maximum public good may be achieved.

The meeting record will be held open for 15 days, following this meeting, for anyone who wishes to submit either additional information or to clarify any views that they might have.

Mr. Tom Crites, assisted by Mrs. Campbell, will be making a verbatim record of the proceedings. If you will, please identify yourself each time that you have a comment to make.

To start the proceedings, Mr. Jensen has a couple of communications from members of the Congress and one statement from the Honorable Claude Pepper, which he would like to read at this particular time. Gene.

MR. EUGENE JENSEN: I have two statements. The first is from Congressman James A. Haley of the Seventh District, Florida. He states, in part:

> "I regret sincerely that I will be unable to attend the meeting or that it will be possible for me to have a representative there.
>
> "I would appreciate it, if the occasion arises, if you could express my interest in this program to those attending the meeting.
>
> "I would appreciate, also, being furnished a copy of the proceedings when the transcript is available."

The second letter that I have is from Congressman J. Herbert Burke, the Tenth District, Florida. He states, in part:

> "While my Congressional duties will require my presence here in Washington on these days, I would be pleased to receive a transcript of the proceedings when it becomes available."

The third statement that I have, which is substantially longer, is from Claude Pepper, Eleventh District, Florida. He has expressed his great interest in this meeting and asked that we express his concern in not being able to be here and asked that we read this statement, which he has prepared, into the record.

I would prefer to read it essentially verbatim.

> "This meeting is evidence of a significant step forward in the cause of conservation.
>
> "Estuaries and estuarine areas of our nation have for too long been objects of neglect and abuse. Their protection and preservation are important elements in a comprehensive and effective conservation

movement which happily has been growing progressively stronger in recent years.

"I am proud of my part in furthering the national effort in this direction. During my service in the Congress, some mighty mileposts along the road have been achieved. I am happy to have played some part in their realization.

"Today there is a nationwide program of watershed protection and flood protection to retain moisture on the land and to control soil erosion.

"Many new national parks and monuments have been created, scenic rivers and recreational areas have been set aside for the benefit of the people and for future generations. Wildlife refuges have been established to protect game and waterfowl.

"Outdoor recreation, of increasing importance in these crucial times of great pressures combined with increased leisure, is being provided for and by an active federal program.

"Great national forests have been enlarged to protect that great natural resource and protect the watersheds of the nation's great river systems.

"Another highly important sphere of activity in conservation is the still relatively new Federal Water Pollution Control Program with which I have been vitally concerned.

"All of these measures have been brought into being as the result of man's destructive activities in 'conquering the wilderness.'

"Hacking away at the trees, rooting up the earth, slaughtering the game, and in many other ways, man, for over three centuries, has been busily fighting nature, upsetting its balance -- in general, 'sullying the nest.'

"A disgraceful situation has developed. The nation's once crystalline pure watercourses, which our founding fathers found so appealing, have become disgracefully foul.

"So bad had the situation become that in 1956, with the safety and health of the nation endangered, the Congress inaugurated a program of federal water pollution control. Successive amendments in 1961 and again in 1965 and 1966 have enlarged the caliber of the attack on the problem.

"I am delighted to have been of some assistance in strengthening this effort to overcome the neglect and abuse of many years.

"In accordance with the terms of these last two Acts, water quality standards are being established throughout the nation; a vigorous program of research, development and demonstration is under way; and technical assistance, as well as financial aid, is being provided for state and local governments for construction of waste-treatment facilities.

"But, most important of all, besides providing the tools with which to attack the problem, this legislation has provided the means of enforcing the requirement of maintenance of the quality of water, the abatement and control of water pollution.

"For some strange reason, one area very closely related to water pollution control, and which cries out for action, has been, until now, relatively ignored, unrecognized and uncomprehended -- that is, estuaries and their related estuarine areas.

"This seems inexplicable now that some attention is being directed to it. Estuaries are significant to human welfare. They have an important role to play in transportation, in the production of food, in the disposal of waste and as a locale for recreational activities.

"Many of the world's largest metropolitan areas have developed on estuaries, and the waste products of the many homes and industries have adversely affected the environment.

"Estuaries and inshore waters are sources of fisheries whose existence depends upon their generally high biological productivity. There is clear evidence that the influence may extend well into the ocean.

"Detailed information concerning such matters as estuarine circulation patterns, rates of exchange of materials with coastal and marine waters, and the ecology of estuarine organisms must be developed if realistic and essential management of the vital estuarine areas is to be attained.

"The development of coastal areas has been very rapid in recent years, but knowledge of estuarine environments has not kept pace with the necessity to resolve problems developing from their intensive use.

"There may have been some reason for the general evasion of consideration of estuarine problems because of the somewhat hazy bounds of jurisdiction involved.

"No one has been quite sure what the true definition of an estuary is, who owned it or was responsible for its condition.

"Now there is some agreement as to the bound of this important area. Where salt water meets the fresh water of flowing streams, there exists a zone of varying extent, where the river waters, the ocean tides, coastal currents and the contours of the shore interact.

"The result is the deposition of river sediment and sediments washed up by the sea. The area is a holding place for the development of nutrients, for the spawning of fish, breeding of waterfowl and some varieties of fur-bearing animals.

"It is the natural habitat of shellfish, but it is also the recipient of a great deal of pollutants which are growing in quantity and in complexity. Therein lies the great danger and threat to the very existence of the great mass of living organisms which depend upon it.

"Over 90 percent of the total harvest of seafood taken from waters off the United States is taken on the Continental Shelf. Two thirds of that is composed of species which have spent some period of their life span in estuarine areas and whose continued existence is wholly dependent upon their maintenance in at least as good quality and productive capability as at present.

"The waters of estuaries, including bays, lagoons, bayous, marshes and other wetlands, are the haven for millions of waterfowl of numberless varieties, and for shellfish which form a staple of the diet of millions of people.

"Thousands of jobs are dependent upon the taking of shellfish, fishing and boating in estuaries. Sportsmen by the thousands seek gamefish and waterfowl which are to be found therein, or which spend a good deal of time there, but all of which are dependent upon the aquatic life found there.

"If estuaries and their adjoining estuarine areas are to fulfill their allotted place in nature's scheme of things, they must be preserved and protected. This is not the case in America today, save in a few very isolated instances.

"Of the over 26 million acres to which the term 'estuary' may be applied, 600,000 acres have been completely lost by being rendered unfit for the growth of fish and wildlife.

"The quality and nourishment-productive capacity of a vast, but unknown, additional area is being inhibited by the increasing amounts of pollution pouring into them from the nation's rivers and streams.

"Pollution of estuaries upsets the delicate ecological balance which makes them so important. Pollution may be fluid in the form of raw or insufficiently processed sanitary wastes, acids and other corrosive substances, oil spills and many other deleterious substances.

"Pollution may also take the form of excess sediment and silt, which chokes off the natural development of aquatic life and organisms that are so necessary to other forms of life of great economic value.

"In another form, perhaps as dangerous, and potentially destructive to the continuance of estuaries has come about due to the encroachment of human activities.

"Their location has attracted the real estate developer who fills in along the shoreline for cheap land upon which to build. The waterside industry may need room for expansion of his plant, so he also fills in along the shore.

"Growing waterborne commerce may require improved channels, thus they are dredged, and the spoil is deposited wherever there may be unused land or shallow water.

"In recent years, there has been a growing movement to erect structures on nearby shore or in the water itself in order to provide protection from hurricanes or to preserve the recreational values of beaches.

"Each of these activities tends to alter the natural ebb and flow of water, adds to the pollution, and changes the ecology of the environment.

"Unfortunately, many estuaries, because of their location at the mouths of great rivers, are the locale of large metropolitan centers.

"This has accelerated their deterioration and eventually, unless corrective measures are undertaken, they will lose their value as recreational resources.

"This latter factor is becoming daily more important. The growing popularity of boating is bringing more and more people into estuary and estuarine waters, and they are becoming cognizant of their condition.

"It is high time that such a precious resource be extended a protective shield against its ultimate destruction; no time must be lost.

"The matter of jurisdiction must be settled by the cooperation of all the various levels of government; the federal government, logically, must take the lead.

"Too long has this been considered to be the responsibility of a few adjoining property holders of the nearest, and perhaps smallest and weakest, public body.

"The impact of any alteration in the environment extends far beyond their jurisdiction and responsibilities.

"It is important to recognize the full extent and bounds of the nation's estuaries. Basic data is necessary to a full understanding of the problem and is necessary to any effort to protect and preserve them in their natural state.

"Corrective measures must be determined and undertaken, if our great fishing industry is to prosper, if waterfowl and other game species are to continue to grace our skies, land and waters, and if pleasurable recreation is to continue to be enjoyed by the many.

"In furthering these estimable goals, I wish you Godspeed."

MR. THOMAN: Mr. Patton, would you like to make any remarks?

MR. VINCENT PATTON: I don't have any remarks to make at this time, Jack. I would like to introduce one of my six bosses, Mr. Roberts, from Miami. (Mr. John P. Roberts stood in response.)

MR. THOMAN: Mr. Roberts is one of two appointed managers of the Florida Air and Water Pollution Control Commission, the other one being Mr. Reed, who will be here later today.

In our other two meetings, it looked like strictly a stag affair, in that it was all men, until the lady from the League of Women Voters got up. Today we are privileged to start off with the Honorable Elizabeth J. Johnson, from Cocoa Beach, Florida.

Senator Johnson, we are most happy to have you here.

SENATOR ELIZABETH J. JOHNSON: I am delighted to be here today. Although I am apprehensive of the federal government's involvement in the sale and development of submerged lands and the control of pollution flowing into our estuaries, I am conscious of the great need for a thorough review of the State of Florida's present policies and philosophies of estuarine management.

I am not prepared to admit that the state is incapable of recognizing the inestimable value of its resources and properly managing this nonrenewable asset.

Once the estuaries are destroyed by dredge and fill operations, they are lost to the people of Florida, the rightful owners of this property, forever.

Although significant legislation passed into law this past session, I suspect that there are forces today that look forward to returning to the days of sell, sell and dredge, dredge -- all in the name of progress.

Why can't the trustees of the Internal Improvement Fund resist? Why doesn't the staff of the trustees take a much firmer line on applications for sale of sovereign lands? These are questions which will be explored at this conference.

I am dismayed at the lists of submerged lands presented each Tuesday in Tallahassee for consideration for sale. Even though a moratorium on sales was imposed a year and a half ago for a year's period of time, during that period of time, land was consistently sold under the guise of extenuating circumstances and emergency situations, with emergency being interpreted in a variety of ways.

I propose a radically different policy. Let's remove vast areas of submerged bottom lands from the market. Why not create a land trust, an inviolable trust, which preserves these bottoms for the future generations of fish and marine culture?

Why should we allow the destruction of the very resources which brought many of us to Florida?

Pollution of our estuaries is not caused solely by dredge and fill operations. Run-off from septic tanks, insufficient treatment of industrial and municipal wastes, agricultural fertilizers and raw sewage from yachts and houseboats are all contributing to the decline of these great, productive nurseries.

I urge the Florida Air and Water Pollution Control Commission to exercise the many powers at their disposal to reverse the despoiling of our tidal waters.

Sanitary districts, rigid inspection, enforcement of the law, bright approaches to old problems will, if you'll pardon the pun, turn the tide.

I am most pleased to see Mr. Thoman here representing the Federal Water Pollution Control Administration.

Mr. Thoman, we need immediate studies in our coastal counties to determine the feasibility of releasing our waste into the sea, rather than our estuaries.

We need to know what type of treatment is necessary so that we do not produce a problem offshore. We need to know how long virus live in warm salt water and the speed of the disbursement of wastes.

We need to know what distances out-fall pipes need to be. We need your help to obtain federal study moneys. I recognize how difficult the problem of funding will be as long as the war continues, but frankly, we can't wait.

In summation, our estuaries need to be protected. Much can be done here in Florida at the state and county level.

Through a concentrated "Save Our Waterways" campaign by the Orlando and Brevard "Sentinel," the public is becoming rapidly aware of our existing situation, and they are demanding solutions.

Our philosophy must change from development at any price to preserving the environment which brought us to Florida and which makes Florida --

if I can use the Governor's expression -- "Nature's Land."

Mr. Thoman, I have for you a scrapbook that has been compiled from articles, photos and reactions to the campaign by the Orlando and Brevard "Sentinel."

I think it will aid you in your study. It's a comprehensive look at our estuaries in our particular area. Thank you for allowing me to come and make a presentation.

MR. THOMAN: Thank you very much, Senator.

Do you have any questions, Gene?

MR. JENSEN: You mentioned the idea of a land trust for the State of Florida. Do you think this concept might apply nationally, as well as to other states?

SENATOR JOHNSON: Being so, I see no reason why it should not.

MR. JENSEN: Should the federal government have any role in this sort of a land trust?

SENATOR JOHNSON: Well, I believe right now that it should be a state problem. I believe the state should create its land trust. I really don't know until such time as it -- my suggestion is taken into consideration by the state.

I wouldn't care to comment on what role the federal government could play in it. I do believe it is a state responsibility at this point.

MR. JENSEN: I ask this because the Act that we have is to include in our recommendations and analysis of the respective roles of federal, state and local governments.

SENATOR JOHNSON: Well, I'm quite sure that the federal government could be of assistance in establishing land trusts in our nation. I am concerned with the state, of course, but I'm quite sure that the federal government could give assistance.

MR. JENSEN: One of the other pollution problems that has gotten a great deal of publicity in recent years, or in recent months, is the matter of oil spills, which goes along with a major part of development.

Do you have any suggestions or any thoughts as to how the number of ports may be -- I hate to say limited -- controlled or something, so that we may limit the number of opportunities for major oil spills, major accidents of this kind?

SENATOR JOHNSON: No, sir, I couldn't comment.

MR. JOHN WAKEFIELD: I would like to ask Senator Johnson if there have been any state funds made available for the type of studies to participate in the studies that you were mentioning.

SENATOR JOHNSON: We have, in the past session, just created the Florida Air and Water Pollution Board, under the direction of Nathaniel Reed, as Mr. Thoman said.

When this will be made available, I could not state at this time. I am sure that Mr. Reed can give you the exact figures as to the amounts available.

We do need federal participation.

MR. WAKEFIELD: You would be suggesting that the states participate in these studies?

SENATOR JOHNSON: Yes, I would, sir.

MR. THOMAN: Mr. Patton, do you have any questions?

MR. PATTON: No

MR. THOMAN: Thank you very much, Senator Johnson.

Next I would like to call on the Honorable Mr. Reedy, member of the Florida House of Representatives, Eustis, Florida.

REPRESENTATIVE W. H. (Bill) REEDY: First of all, I would like to say welcome to Central Florida.

MR. THOMAN: Thank you.

REPRESENTATIVE REEDY: I deeply appreciate the invitation from the Honorable Claude R. Kirk, Jr., to be here to make this statement.

In answer to one of the questions asked of Senator Johnson, I feel that each state should have a land trust, as she has suggested, and that the federal government could assist by giving guidelines and assistance in this area and to help out each of the states collectively with a Land Trust Fund.

In answer to the oil condition in the areas where ships break up and spill oil, to me, I have long thought that there should be an emergency equipment area provided by the coastal service or whatever might be necessary that could move in quickly and could remove this oil before it is lost from its tanks or its reservoirs before it destroys the coastline and the areas at which it is.

I sincerely hope that this Clean Water Act of 1966 will be as meaningful to the United States and to all the states of this nation as has been and will be the Highway Safety Act of 1966.

I feel that these are two areas that we as citizens of the states of this nation and citizens of this government -- we have long withdrawn from the real support that we should have given these two areas.

I am glad to see that the Congress of the United States is finally beginning to nudge the people of this nation throughout the states to start doing something about something that should have been done a long time ago.

I'd like to begin by making a statement which, I'm sure, is a mutual feeling of everyone here today: Estuarine areas in Florida are a vital asset to this state's commercial and recreational resources.

Florida's scenic beauty, fishing facilities and recreational havens along its coastlines have been a key factor involving population growth and tourism, and commercial fishing has long been an economic factor.

Estuaries provide nesting and wintering habitat for migratory waterfowl. They furnish a resident area for various types of animals, including fur-bearing types.

One need only drive along Florida's coastline to witness the recreational advantages. Two thirds of all coastal sport fish are estuary dependent during part of their lives.

Estuaries are the spawning grounds or the rearing ponds for many species of commercial fish, and other fish pass through the estuaries on their way from the sea to fresh-water streams to spawn, and the young return again to the sea.

Some species spend their entire lives in estuaries. Approximately two thirds of the total harvest of seafood is dependent at one time or another on estuaries.

The value of these estuaries to Florida is obvious. There is not another state where fishing is more important economically.

Florida does a four-billion-dollar tourism business yearly, and 31 percent of the tourists come to the state for fishing. The dollar value of fishing to the state is more than one billion dollars per year, and in addition, we enjoy a 30-million-dollar-per-year ex-vessel commercial fishing industry.

At the same time, Florida is attracting new industry at a greater rate each year, and, as the population soars, men are reshaping the shorelines to make housing developments; new bridges are being built for faster commuting between cities; and new channels are being dredged for convenience and navigation purposes.

As we develop better, more progressive and more modern means for serving the needs of our growing state, we've also been slowly strangling the "goose that laid the golden egg."

Each time industry pours waste into our estuaries, each time a shoreline is reshaped for urban development to house our new population, each time a new bridge is built, each time a channel is dredged, we disturb the natural environment.

During the past 20 years in Florida, we've lost 7.5 percent of the basic habitat in our estuaries by dredging and filling.

This may seem small in comparison to California's loss, which is estimated at 67 percent during the past 20 years. However, considering California's growth and influx of industry, and as we daily witness in Florida a new and continued influx in population and industry, it should serve as a very clear warning to us to begin now to solve the problems facing our estuarine areas.

In Boca Ciega Bay and Tampa Bay, there is a total of 245,000 acres of estuarine area. Twenty-nine thousand acres of that area has been filled by man-made methods. That represents 33 percent of the region.

In many instances, developers build new land and place houses on the fill. The bottom of the estuary is draglined, producing damage in two ways: loss of surface and destruction to the bottom by the dragline.

In Tampa Bay, ten years after the draglining is performed, the bottom estuarine region still has no life.

It's become very fashionable in Florida, also, to build fingers of land within estuarine areas for residential areas, as well as channels for boat dockage and navigation, and this is extremely damaging to the natural habitat.

Wetlands are drained for agricultural purposes. They're contaminated by a wide variety of pollutants, such as industrial and chemical wastes, raw sewage, or any number of fish-killing pollutants.

They're clouded by silt because of lack of erosion control. Even improvement works for hurricane protection can do their damage. This is a state-wide problem.

From 1955 to 1965, 22,500 acres of submerged lands in Florida went into private hands or to local government. A good portion of the land was on the southwest coast and the Florida Keys and along the east coastline.

In a state where 31 percent of the tourists come to the state for fishing, Florida can't afford to allow the erosion and pollution of our waters to continue.

Florida realizes the importance of the matter, and, during the 1967 legislative session, a Pollution Control Commission was set up which Mr. Nathaniel Reed heads and which is making good progress.

I have worked with Mr. Reed in the area of water pollution of our freshwater streams and land-locked lakes and was very pleased to see a bill passed which set up pollution control measures in Lake County.

I have strongly supported the State Pollution Control Commission, and I believe the State of Florida is well on its way to the effective control of pollution and ruination of all our waters, and specifically, our estuarine regions.

I might add that our Governor, the Honorable Claude R. Kirk, has voiced strong support and a willingness to lead the way in cleaning up our waters and making the best possible use of them.

All submerged lands in Florida are owned by the public. They are held in trust by the Internal Improvement Fund which is headed by our Governor.

These submerged lands can be sold -- to the bulkhead line established by the counties -- and Florida has realized the importance of using proper controls in the sale of these lands.

Our Attorney General, the Honorable Earl Faircloth, our State Treasurer, the Honorable Broward Williams, and our Secretary of State, the Honorable Tom Adams, and many others have voiced strong opinion as to the sale of these submerged lands and restrictions which are needed to cope with the growing problem of loss of our estuarine regions.

Among proposals which have been made to qualify these sales are:

(1) Make the purchaser justify his intended use of the land before purchase.

(2) Require engineering, ecological and recreation utilization studies before any tract of submerged land is considered for sale.

(3) Guarantee the general public and not just adjacent landowners that adequate notice of all sales applications will allow time for objections to be submitted.

(4) Make sure before any sale that the land involved is not vital to erosion control, public recreation or the preservation of marine life or wildlife.

We need to strike a happy balance. Florida needs industry. We need land for housing developments where population is crowding our coastlines, and we must preserve our estuarine regions.

Estuaries are vital to the preservation of all our waters, and Florida's fresh and salt waters combined are the most vital resource to our state.

I would suggest that areas that are relatively unaffected by development be set aside, zoned, for industry and housing, and that our estuarine regions which can be adversely affected by development be preserved for their intended purpose and left to their natural habitat.

Full studies are needed, and I'm grateful to the United States Department of the Interior for the interest expressed in preservation of our waterways on a national scale.

Indeed, it is a national problem, and, of course, our fish don't recognize state boundaries. However, local government should have the main responsibility.

I believe that the State of Florida is anxious and capable concerning the clean-up and preservation of our estuarine regions.

In my home county, Lake County, a strong water pollution and air control bill was introduced by me in the State Legislature and passed during the 1967 session.

The county commissioners in Lake County have activated this bill and are in the process of fully implementing the act.

This act is identical to the Orange County Water Pollution and Air Control Bill, and I'm sure that by the enforcement of this act that polluted streams in this two-county area will show a great improvement in the near future.

Other areas of Florida have likewise taken interest in working toward a solution to the problems which affect their particular area, and I believe that the best results will come from programs which are keyed [illegible] specific areas.

I believe this can be done by county and state government working together and by state and federal government cooperating toward a workable solution, one for this most important problem.

I feel that each of us, as citizens, must become involved wherever pollution exists in our state and our nation today. I strongly support good tight pollution control to bring about clean water and good sport and commercial fishing throughout our nation.

Thank you very much.

MR. THOMAN: Thank you very much, Mr. Reedy. It is interesting, your mentioning this zoning concept. This came out at our hearing in Georgia. It was the first time that it had.

Should this be done by the state, or should it be done by the counties?

REPRESENTATIVE REEDY: I think where it involves state land control of state land in the estuary areas, I think it should be on a state-controlled basis; and where it involved land owned by the counties, it should be in the county zone areas.

I think the quicker we move in this area of zoning the estuary regions of our state -- because this is so vitally important to the state, the State of Florida, that it should be done as quickly as possible.

MR. THOMAN: Thank you. Mr. Jensen, do you have anything?

MR. JENSEN: No.

MR. WAKEFIELD: Bill, do I understand that you are suggesting that by zoning you would restrict the use of bulkhead?

REPRESENTATIVE REEDY: We would restrict the estuarine areas to the best ability of the people of this region and the state.

MR. WAKEFIELD: Thank you.

MR. THOMAN: Thank you, again, Mr. Reedy, and we certainly appreciate that fine statement. It indicates to me that the people in Florida are thinking in terms of the ecology, or the total ecology, of the area, and hopefully, in the future, we won't have all of these man-made alterations of the environment performed or done without concern for proper development, overall development of the estuarine areas, the water areas, for that matter.

REPRESENTATIVE REEDY: I believe that Mr. Wakefield will hear more about work being done in the area of pollution in the State of Florida today than he probably has heard in all the years he has been in the State of Florida.

As I say, we are beginning to get with it in this state.

MR. THOMAN: Again, thank you. Next we have the Honorable Lynwood Arnold, Jacksonville.

REPRESENTATIVE LYNWOOD ARNOLD: Mr. Chairman, ladies and gentlemen: My name is Lynwood Arnold. I am a member of the House of Representatives.

In 1966, I had the honor to succeed the late Charlie Usina as a member of the Atlantic States Marine Fisheries Commission.

I felt honored to be asked to come here today to provide a brief statement concerning our estuaries and our need to protect them. Many of us here in Florida have watched with great interest the studies that have been made of our river mouths and abutments.

We have been proud of our Conservation Department and the patient work with which its recognized scientists year after year establish an understanding of, and appreciation for, the great wealth of our coastal waters.

I am told on good authority that Florida was the first state to provide detailed scientific information of estuaries and get enough to identify them as a most productive acreage in the world.

We are also proud of the actions of the Florida Legislature. That body, with the scientists' records in hand, acted in the last session to protect our salt and brackish water heritage by passing the Ted Randall Bill and by directing a new state agency for the alleviation of air and water pollution.

For those who are not familiar with it, the Randall Bill provides the protection of shoreline areas and protects the submerged land from indiscriminate and harmful coastal development projects.

I think it would be safe to say that we here in Florida recognize the value of our estuaries and are moving as rapidly as possible to provide them with the protection they deserve.

Mr. Chairman, for the record, I would like to submit to you a copy of the Randall Bill.

MR. THOMAN: Thank you very much, Mr. Arnold. We will include it in the proceedings. We appreciate your taking time to be with us today.

Next I would like to call Mr. Earle R. Kraft, Chairman of the Board of County Commissioners of Broward County, Fort Lauderdale. Mr. Kraft.

MR. EARLE R. KRAFT: Thank you. Before I start, I would like to comment on Senator Johnson's remarks. We are interested very deeply in the danger of rupture or leakage of oil in the different ports.

An example of this was just last week we had a tanker go ashore down in the Bahamas, and it spilled oil all over.

MR. THOMAN: Mr. Kraft, we have one in San Juan, Puerto Rico, that is keeping a lot of us up nights. I think, if I may interject a comment, that following this episode in San Juan, there will be action in the United States Congress in this present session to tighten up the laws relating to the pollution of the sea by oil.

We, hopefully, in response to one of the other suggestions, in the future, will have emergency equipment and methods available in various spots in the country.

MR. KRAFT: In Port Everglades we have quite a few tankers coming in there, and we are deeply concerned.

MR. THOMAN: If you ever get a spill, you will have every salesman in the world trying to sell you something.

MR. KRAFT: We are even considering vacuum cleaners.

MR. THOMAN: They are using them in San Juan, Puerto Rico, right now.

MR. KRAFT: In accordance with the letter of February 13 from John R. Thoman, Regional Director of the Federal Water Pollution Control Administration, I am pleased to present to you today my comments and recommendations, as related to estuarine bodies of water in Broward County, Florida.

This county is situated on the lower southeast coast of Florida, with the eastern boundary the Atlantic Ocean. Within the county are two ocean inlets: Port Everglades, located on the south side of the City of Fort Lauderdale, and Hillsboro Inlet, located north of the City of Pompano Beach.

In recent years, the channel at Port Everglades has been widened and deepened, with the resultant effect that it has become one of the major ports on the eastern seaboard of the U. S. A.

It is now the deepest channel south of Norfolk, Virginia. With the construction of modern passenger terminals by the Broward County Port Authority, it now has a large number of passenger ships using it as a port of call.

Paralleling the coastline of Broward County is a strip of beach varying in width from one-fourth to one-half mile separated from the mainland by the intracoastal waterway.

Tributary to this waterway are -- from north to south -- the Hillsboro River, Cypress Creek, Middle River, New River, Dania Cut-Off Canal, West Lake, North Lake and South Lake.

Various primary drainage canals, constructed by the Corps of Engineers and operated and maintained by the Central and South Florida Flood Control District, in turn, are tributary to these waters.

All of these bodies of water are classed in the category of estuaries, as the waters in them are salty to brackish, and all receive varying degrees of tidal influence.

As eastern Broward County originally was predominantly mangrove swamp, the development of this area involved the dredging of numerous waterways and canals in order to provide sufficient fill material.

Within the corporate limits of Fort Lauderdale, there are in excess of 240 miles of waterways, all of which are brackish and tidal in nature.

The Cities of Deerfield Beach, Pompano Beach, Lauderdale-By-The-Sea, Hollywood and Hallandale also have many miles of similar canals.

Frontage on these waterways -- with the exception of oceanfront property -- is considered to be the most desirable, therefore the most expensive, building property in the county.

Millions of dollars of condominiums, cooperative apartments and single-family residences have been constructed along these waterways. The residents of these dwellings, as well as residents from all over the county, utilize these waterways for boating, fishing and water skiing.

It is obvious the estuarine resources of Broward County are of incalculable value to our area. It is imperative that these waters be protected fully against pollution and contamination of all types.

This is not only from the public health and aesthetic standpoints, but from the economic aspect: Tourism is the lifeblood of this area. Approximately 1,500,000 persons annually visit Broward County, spending an estimated 250 million dollars.

In accordance with the Clean Water Restoration Act of 1966, the Florida State Board of Health has recommended that the estuarine waters of Broward County receive a Class III designation, which is that prescribed for waters used for recreational purposes.

I would recommend that authority for the control of contamination and pollution of these waters, together with their management, remain in accordance with Chapter 67-436, Statutes of Florida, which created the Florida Air and Water Pollution Control Commission.

The Bureau of Sanitary Engineering of the Florida State Board of Health is now their authorized agent, with local regulations being carried out by the Broward County Health Department.

Enforcement of stream pollution regulations should be strengthened. In Broward County, special consideration should be given to the control and abatement of marina and boat pollution.

Safeguards set up for petroleum handling at Port Everglades and the elimination of the unauthorized discharge of crude oil residue from ocean-going tankers is of importance.

To insure the protection of these estuarine resources, an effective pollution surveillance system, staffed by competent local public health officials, should be put into effect as a safeguard that no improperly treated domestic or industrial waste can pollute or foul these waters.

Broward County today, according to the latest reputable population estimates, has in excess of 550,000 year-round residents. Population projections, prepared by the Broward County Area Planning Board, forecast a population of 1,150,000 persons by 1985.

According to the results of a recent comprehensive air pollution study, Broward County was shown to be the only remaining metropolitan area in the U. S. A. today without major air pollution problems.

Gentlemen, I hope that in the not-too-distant future, the same proud statement can be made as to the quality of our estuarine waters.

MR. THOMAN: Thank you very much, sir.

MR. PATTON: I planned to wait just a little bit, but for Mr. Kraft, there was a letter that went out from the Governor's office to all the ports in the State of Florida asking what emergency procedures and equipment they had on hand to cope with oil spills.

I would anticipate that probably the commission may pass rules or regulations along these lines in the near future. However, this does not solve the problem, because we have not extended state jurisdiction that far yet.

MR. THOMAN: I would next like to call Mr. Neff, who is representing Mr. Ellsworth G. Simmons, Chairman of the Hillsborough County Commission in Tampa.

(Audience indicated Mr. Neff was no longer in the room.)

MR. THOMAN: Is Mayor Nielsen here from Madeira Beach?

MR. WAKEFIELD: He is here.

MR. THOMAN: Mayor Nielsen, would you like to present your statement, sir?

MR. JOHN F. NIELSEN, JR.: I would like to express my thanks for your inviting me to your study. I was pleased to see that someone else is concerned with the situation in Pinellas County.

Representative Reedy mentioned it, and being from across the state, I would like to reciprocate by saying my remarks would also be directed to his area.

To begin with, the following remarks may not be profound or original; however, any constructive contribution to the national problem of pollution, regardless, is part of the sum total in a sincere effort to help solve this critical situation.

The use of the word "pollution" in this statement is meant to mean and be identified with estuarine pollution and the study in progress.

Pollution is the unpleasant by-product of progress. It is found in almost any metropolitan or highly urbanized or industrial area. Its source varies in quantity and nature from area to area.

It can be from industrial wastes, by-products of manufacturing, wastes not completely treated in sanitary sewer systems, excessive dredging and filling and many other sources.

Essentially, these are the general and most prevalent contributors to pollution and apply to our area in Madeira Beach, Pinellas County, Florida.

Madeira Beach and Pinellas County, Florida, are geographically located on the west coast of Florida, approximately halfway down the state, and is a peninsula.

It is surrounded on three sides of its outer perimeter by the Gulf of Mexico, Tampa Bay and Boca Ciega Bay.

Because of its proximity to these bodies of water, it is basically a tourist and recreation area, heavily depending on water resources and the benefits of sport fishing, bathing beaches, swimming, breeding grounds for commercial fishery, water skiing and others to support its tourist and retirement economy.

Locally, within the county and on the state level, efforts are now being made to solve pollution problems. However, those agencies and governmental bodies are limited in their scope of authority and jurisdiction.

We must realize that the antipollution measures and remedies are expensive and the cost factor must be considered as well as applied to the various problems within the pollution field.

For these reasons, I would submit the following as possible steps and procedures to the overall problem of pollution:

1. That the task of control and legislation be allocated to the governmental body best equipped to deal with the problem, funded properly to insure perpetual and successful results.

2. Divide the problem areas into three divisions: (a) Regional, (b) General, (c) Specific.

Under these three divisions should be listed the common problems and unusual conditions. These problems and conditions should be rated by priority determined by their importance and nature.

Coordination by county, state and federal agencies in this field should be of utmost importance in order to avoid duplication of effort.

Because of the magnitude of the problem of pollution and the tremendous cost, it would be impossible to solve or control in a relatively short period of time.

Therefore, I suggest the following approach -- that effective measures be implemented in three stages:

1. Immediate recommendations and solutions to the problem. This should be fostered by extensive and effective legislation in regard to pollution and pollution control.

2. Intermediate recommendations and solutions. Goals to be worked toward in the near future.

3. Long-range analysis and evaluation of the problems projecting into the future.

As to specific recommendations under Item 1 above, immediate recommendations and possible solutions, I would like to focus your attention on the secondary sanitary sewer system experiment that has been conducted since July, 1967, in the City of Madeira Beach.

This undertaking has been by private interests using the municipal primary plant and effluent for said experiments. The nature of these experiments is a concept that has been worked on for some years.

However, to this date, some measure of success has been obtained in purifying the sewer effluent through this method. The method is known as the Gehring Ionic-Dialysis Method of Treating Water and Waste Disposal Process.

As to background, it should be mentioned that Madeira Beach treats raw sewage for three other communities in addition to its own.

Our collection system is some 15 years old with problems due to the nature of tidal flow and water table that are not found in the land-established systems.

It is gravity flow from its furtherest point for some considerable distance which causes the effluent to have properties that make it difficult for treatment.

The physical plant installation of the primary system is of conventional type: wet well, sediment tank, vacuum filter, chlorination chamber and discharge.

Under these experiments, the effluent is extracted with suspended and dissolved solids that are run through a series of chambers and electrically treated, drawing off in the process the constituents of the original effluent separating these and resulting in a sludge which is odor free and the liquid some 97 percent pure or better. A trace of chlorine is about all that one finds in the end liquid product.

This statement not being of technical nature or professional point of view, but rather from an observer and interested official, I would suggest that the results of these experiments which will be available in the very near future be evaluated and regarded as a possible breakthrough in secondary sanitary sewer system applications and possible other uses.

To date, this process has worked; however, the cost per million and other technical data have not yet been compiled.

As of this writing, the instrumentation and evaluation of this process is being compiled by Fischer Porter Company and Newton P. Gehring, the inventor and engineer, at our municipal plant in Madeira Beach.

Being optimistic, I hope this, in some small way, contributes to your study and to pollution problems in general.

Appended to these remarks are a newspaper article, a city manager's report to the City Commission, giving a history of the activities of this particular experiment, and also a booklet that this city has published.

I would like to say that we are very optimistic. Many of you are aware of this particular process. There are people in the Department of the Interior whom we have corresponded with, our district Congressman is aware of this, and so are the State Board of Health officials, and they are working along with us in this particular experiment.

We expect to have some results within 90 days, and this will be documented and sent to the various agencies within the state. Thank you.

MR. THOMAN: Thank you very much, Mayor Nielsen. Are there any questions?

MR. JENSEN: Yes. The problem of zoning or community planning in estuarine areas has been mentioned earlier, but what are your views from the standpoint of the city on zoning or perhaps countywide or perhaps statewide planning for these estuarine areas?

MR. NIELSEN: I am pleased to say, to my knowledge, Pinellas County has no difficulty concerning dredging and fill. I think this is what you're specifically getting at.

They are almost nonexistant. I think it was mentioned -- a remark was made by a Senator before about having some very good reasons to have a dredge and fill permit issue.

Well, this happens to be controlled by the County Commission at this time, which, of course, they and the Corps of Engineers have to approve it.

The City of Madeira Beach, we are surrounded on all sides by water, and to my knowledge, we haven't had a dredge or fill permit in the city for some seven years.

MR. JENSEN: Thank you.

MR. THOMAN: Again, thank you. I would next like to call one of the State of Florida's eminent scientists, Dr. Clarence P. Idyll, Institute of Marine Science, University of Miami, Miami, Florida. Doctor.

DR. CLARENCE P. IDYLL: Mr. Thoman, I greatly appreciate the invitation to make a statement at this hearing. I represent at this hearing the Institute of Marine Science at the University of Miami and the Florida Academy of Sciences.

I am also a member of the Governor's Committee on Natural Resources. I have, Mr. Chairman, a statement here, which I would appreciate being made part of the record.

With your permission, I will not read it, but will summarize it.

MR.THOMAN: We will incorporate the total statement in the record.

DR. IDYLL: I think that the first thing that ought to be emphasized in my statement is that it may well be that of all the 50 states of the United States, Florida has a bigger stake in estuaries than any of the rest.

One of our biologists at the University of Miami, who is engaged nearly full time in estuarine research, has made estimates from careful examination of maps and other material to the effect that the estuarine areas of Florida, which are tidally influenced through some 3310 square miles, which is by far greater than any other state in this region.

For example, the next highest is Louisiana, with something over 2700 square miles; following that, North Carolina with 2500 square miles; and Texas with 2400.

From there on, the southeastern states go down to very much less. More than that, the state attracts its many residents, and the very important visitors to the state, largely because of its climate and because of the general environment of the state, and it is clear to me and to many others who have examined this situation, that the maintenance and cleaning of the edge of the sea areas are very vital indeed to our continued hope of attracting these people, both residents and visitors.

Then Florida ranks about tenth each year in production of commercial fish of the United States. Sport and commercial fishing is worth about 300 million dollars a year to this state, which is a very considerable part of our economy.

I'm going to leave to my friend, Senator Bill Neblett, the opportunity to tell you about the manner in which the shrimp industry depends upon its estuaries.

But just let me tell you that some two years ago the state received from the shrimp industry some 15 million dollars in income, and in addition, another one and a half million dollars from the sale of live shrimp for fishing bait for sport fishermen.

Shrimp depend, if not exclusively, then very heavily indeed, on estuaries for their existence. Briefly, a shrimp spawns offshore in deep waters, the larval stage swim or drift inshore over scores to hundreds of miles, and the young shrimp spend from three to perhaps six months in the estuaries, after which they migrate offshore again to spawn.

Since the life history of the shrimp is approximately one year, they spend as much as half their total life in the estuary. If the estuary doesn't exist or it's degraded in any way, the shrimp cannot live there.

Almost to the exact extent that our estuaries are degraded, our shrimp industry is going to decline. The shrimp is only the most dramatic example of the manner in which the aquatic resources of Florida depend on estuaries, because by far, the greater number of commercial and sport specimens that are landed in the state depend either exclusively or to a large extent on estuaries.

Some examples of these are blue crabs, menhaden -- 30 million pounds of these landed a year, approximately, much more than mullet; and 30 million pounds of spotted, white and red drum, and a great many more.

To repeat what most of you know, the reason estuaires are so vitally important to our aquatic resources, if they are not the most productive areas of either land or water, they come awfully close to it.

The most productive areas of estuaries produce more living material than the most productive of land areas, including those amazing corn-producing prairie lands of Iowa and other places.

The estuaries are far more productive than open ocean areas. So when you talk about the production of the sea, you're talking about estuarine production.

Estuaries do this remarkable job because this is where nutrients are trapped, and the shallow areas of the estuaries with their nutrient, with the high illumination and with the ability to produce plants, are biologically of extreme importance indeed.

When you fill estuaries, you're destroying a great deal of the productivity of the oceans. This is a point that I think requires emphasis, because a lot of us think of the open ocean where they see sport fishing and commercial fishing congregated as the important areas, but in fact, it's the edge of the sea areas where the shrimp fishes are produced which are of great importance beyond this.

Now, the next biological characteristic of estuaries is that they maintain an extremely delicate ecological balance. Their complexity and delicacy of this balance become more apparent to those who are involved in scientific studies of estuaries year by year.

The complexity means that if one part of the estuarine ecosystem is disturbed, the whole thing falls like a house of cards. If you remove one part, the whole business collapses.

Therefore, if you fill the estuaries, if you change them in terms of their salinity and other characteristics, it's as though you had covered them over with a sheet of concrete.

It's not necessary to destroy the whole thing, to ruin them; all you have to do is destroy one part of a very complex system.

We have carried on ecological studies in estuaries at the Institute of Marine Science in Miami for some 15 years. One of the things that has come out very strongly as a result of these studies is that to the extent that you change the salinity of the estuaries, you have markedly changed their capability of producing animals.

One of the estuaries that we have carried on extensive studies in is the Florida Bay, which is the area to the extreme south of the state, just beyond the southern part of the peninsula.

One of our scientists has discovered, for example, that as the salinity rises, consequent to the shortage of fresh water, the salinity becomes a very much higher than normal sea water salinity which is roughly 35 parts to a thousand.

As the salinity exceeds 50 parts per thousand, these areas become virtually biological deserts, and long before this level is achieved, the numbers and varieties of animals have greatly decreased.

Now, this is only one of the changes that can take place, but this business of changing salinity is commonly encountered and one of the great dangers in our changing estuaries.

I could echo a good many of the remarks that previous speakers have made. I think I will allow you to simply read some of the things that I have to say in the printed statement, but I would like to point out something that must be apparent to you and which applies very closely to our problem, and that is that it seems to me that most of the problems of mankind are related in some way to the pressures of our civilization, the pressures of our population.

The problems that we are talking about today, difficulties of finding solutions mainly to the maintenance of our estuaries are related to the fact that with the increasing population, there becomes increasing competition for all areas, including estuarine areas.

If we could somehow or another find space, find recreation space, find food for all the people who are on the earth and who are appearing so rapidly on the earth, then we have no estuarine problem, because it must be apparent -- obviously apparent to the speakers who have appeared before you today -- that the realization has come belatedly to the United States public that estuaries are places not to be filled or destroyed, but to be cherished and conserved.

Yet we still have a problem, and the reason we have the problem is that we are faced with this competition among varying kinds of interests.

All of these interests have either high validity, or to some extent validity; it's perfectly valid to try to make a dollar, for example, but this is one of the pressures that we have.

Now, if we are to make any kind of balanced judgment as to the proper way of resolving these opposing interests, we have first of all to recognize the value of the estuaries, which, as I say, is becoming more apparent.

But I think that one of the principles that perhaps hasn't been stated with enough forcefulness, and which I would like to underline, and perhaps this is -- if I get nothing across at all in my message today except this -- it's that if you do change an estuary to its detriment, you can't unchange it. It's gone.

Therefore, if there is any real doubt as to whatever is to be done to the estuary, any change that is to be made to it, if there is any real doubt as to whether or not it will be harmful, don't do it, because you can't do it.

If you fill your estuary, you can't unfill it. If you destroy the animals and plants, you can't bring them to life again. If you fill it with pollutants, you have a dickens of a time taking them out again. It's practically impossible.

It may be that the newest and perhaps the most formidable problem that we face in our estuaries is thermal pollution. This is not new. It's only the magnitude of the problem that is new.

We have had thermal pollution in our estuaries for a good many years, in fact, as long as we have had power plants on the shores of our estuaries.

Our problem now is that we are getting more thermal pollution than in the past. Power plants are situated on the edge of estuaries for the very good reason that they require vast quantities of waters to cool their condensers.

This is the case with fossil fuel plants, as well as nuclear plants. The only difference is the nuclear plants require more water than those, and the elevation of temperature is higher.

There are some extremely interesting and productive and frightening statistics about the probability of increasing this kind of problem in the future.

The increase in our population is a frightening thing, to me. There is an increase of about two and a half percent per year in population generally.

I think this is high. Then you should know that the demands for power in this country are even higher than this, in fact, a great deal higher.

The United States as a whole, it's estimated that we will require, ten years from now, a short ten years from now, some 440 million kilowatts of power, which is double the present load.

In Florida, the pressure of demand in ten years is going to be even greater. We now have power input of 7.7 million kilowatts in Florida, and in ten years, we will have 20 million.

Now, this means that we are going to have more power plants, and more than that, we are going to have more nuclear power plants.

At the present time, in the United States, from one to two percent of our power comes from nuclear plants, and in a few years, it is expected that this will rise to perhaps 30 percent.

Now, the problem with power plants in estuaries is a simple one. These estuaries are being supplied, if that is the word -- into them is being poured fantastic quantities of water heated anywhere from 10 degrees to 20 degrees Fahrenheit.

It may well be that these great quantities of water, which in this case is Biscayne Bay, where the Turkey Point power plant is going to receive the fantastic amount of 1.8 million gallons per minute, which is roughly the flow of the Connecticut River.

Now, the problem that we face is that we don't know what is going to happen when this water gets in the bay. I am embarrassed and I am disturbed by the fact that when people come to me as an ecologist and say, "What is going to happen to this water?" I tell them, "I don't know."

There is a second thing I want to get across to this gathering in my talk today, and that is, in this area of ecology, especially, but in every area of ecology that relates to estuaries, we are very much in the dark.

We have a gooddeal of information about Florida estuaries in our files. We have published a lot of it. We are in the process of preparing a lot more for publication, but the fact is, when it gets down to the details which you and I must know to save our estuaries, I can't supply them.

My staff can't supply them, and there isn't anybody in the country, I think, who can supply them. So the message here is that we hurry. We don't have much time.

Nature works slowly, and in order to find out how it's working, you have to take your time. We must not wait very much longer for research on that. The research on estuaries in respect to thermal pollution is only one of a great many problems.

We do not know nearly enough about what happens to estuaries in response to a thousand pressures of civilization, and Mr. Thoman, I realize that you are a strong proponent of this kind of thing, and I hope that you and your organization and anyone that has any influence, which means all of us, will help to produce the kind of research and kind of information we need.

MR. THOMAN: Thank you very much, Dr. Idyll. Does your prepared statement include any figures on what you people think the dollar value of research in this area should be?

If it doesn't, may I ask you to give some thought and submit it for the record.

DR. IDYLL: Well, I can't really answer you in too specific terms. Florida's local amount of research would be a sum which might even scare the Washington bureaucrats.

We have put in a proposal, for example.

MR. THOMAN: We ought to take that off the record, don't you think? (Laughter)

DR. IDYLL: We have put in a proposal, sir, to study the probable effects of thermal pollution on Biscayne Bay that had a price tag which was $800,000, and I believe this was a realistic sum.

MR. THOMAN: Thank you very much, Dr. Idyll.

MR. JENSEN: Doctor, I have several questions. One, a couple of them I want to preface just a little bit.

As part of this National Estuarine Pollution Study, we expect to schedule a conference in Washington approximately one year from now, which will bring together many of the estuarine scientists from various parts of the country -- perhaps a three- or four-day meeting to, hopefully, outline many of these research needs and to identify some of the special facilities that are going to be needed for them.

I certainly agree with you that the amount of money that is needed in here is large. I'm not sure it's enough to scare a Washington bureaucrat.

The San Francisco Bay Conservation and Development Commission was established by an act of the State Legislature. They became terribly concerned because most of the Bay was being filled in.

They declared what amounts to a moratorium on development of the Bay until necessary facts can be obtained.

Do you think this might be a good practice in other parts of the country, that is, a moratorium on massive changes in the use of these estuaries until we can get the critical information?

DR. IDYLL: In principle, I certainly agree with you. We are up against a good many things in Florida, for example, which have gone so far that it seems, to me, almost impossible to declare a moratorium.

I think at our Turkey Point plant -- for example, here's a hundred-million-dollar plant that exists. If we put a moratorium on the operation of this plant because we don't know what is going to happen to the hot water, I think that this would be almost impossible.

I think that in general this will be a good idea where it wouldn't cause great upsets in what is going on in the industrialization of the state.

I think we have an opportunity not to stop things, but to perhaps turn them to our advantage. One of the bright aspects of studies on ecology of estuaries in response to warm water is that in some cases, at least, the warm water is being turned to an advantage, and I think specifically of Long Island, Mr. Jensen, that you know about, where oysters are being raised in the heated effluent from a power plant there.

I'm hopeful that in Florida we can do the same, despite the fact that our climate is salubrious. In the winter it gets cool enough that a good many marine animals either move or reduce their activities greatly.

I can see the opportunity that we can use the heated effluent from the Turkey Point plant to improve the ecology of Florida Bay in the wintertime. I can see a strong possibility of considerable harm to it in the summertime, and, again, this is one of the areas in which we are badly in need of information.

I cannot answer your question categorically, but I think where it is possible, it would be a first-rate idea.

MR. JENSEN: You mentioned nutrients and the role of the estuary as a sort of nutrient trap or nutrient converter. In other places, such as Lake Erie, nutrients have become quite a problem.

Do you feel they are generally a major problem in estuarine areas, or are they a benefit?

DR. IDYLL: Well, you have to differentiate between natural and unnatural nutrients that come from sewage pollution. I think that nutrients that come from sewage pollution are likely to be harmful.

MR. JENSEN: How about pesticides?

DR. IDYLL: I'm against them. (Laughter) That's a flippant statement, which I obviously don't mean. We must have pesticides, but there are certain kinds of pesticides which ought not to be allowed to get into the estuary.

This can, as you're well aware, be a difficult thing to control. If you put pesticides in farmland and the farmland drains into the sea, you're going to get pesticides in the sea.

What we must obviously do is find out what kinds of pesticides cause no harm or the least kind of harm in respect to those areas.

MR. JENSEN: What is the action of pesticides on the inhabitants of the estuaries?

DR. IDYLL: Well, many pesticides are designed to immobilize or kill invertebrate animals, and a lot of them are insecticides, and the action on the insect is various on varied kinds of biological phenomena and so on.

The difficulty that we face in the estuaries in response to this threat is that a good many of the animals that are necessary to maintain the integrity of the biological components of the estuary are crustaceans, which are biologically rather closely related to insects.

If the presticide damages the insect, kills it, it's very likely to do the very same for the crustaceans.

MR. JENSEN: My last question is, simply, do you regard Florida Bay as an estuary?

DR. IDYLL: Yes, sir.

MR. THOMAN: A question, Mr. Wakefield?

MR. WAKEFIELD: I have been aware of your Institute for many years, but I am not aware of your method of financing at the present time. I assume that you get substantial assistance from federal funds at the present time, do you not?

DR. IDYLL: Yes, sir, we do.

MR. WAKEFIELD: How about state and local funds?

DR. IDYLL: We have a staff of around 400 people, including about 190 professionals. Our activity is mostly research, although we have 122 graduate students seeking Ph.D. and Master's Degrees.

I would venture to say that well over 90 percent of our funding is from federal government agencies. State agencies are a very much smaller percentage, and there is some support from industrial sources.

MR. THOMAN: Mr. Patton.

MR. PATTON: I would like to ask one question. Doctor, you made a statement that you were against the nutrients from sewage, I believe, you put it.

Do you have any firm feeling of the amount of nutrients of the various elements that are required for proper life in the estuaries, regardless of the sources?

DR. IDYLL: Well, I didn't really say I was against nutrients. I said that I thought in many cases the amount of nutrients that comes from sewage effluent is likely to do harm.

I can't answer your second question. I think the problem is that a given area of estuary is a consequence of maybe a million years of balance of ecology, you see, that every one of them is slightly -- I am a little afraid of the nutrients that come from sewage effluent.

I am afraid, for example, of the proposals that have been made to dump very large quantities of water, treated water, from sewage-treatment plants back inland into the Everglades estuary.

The statement that this water will be potable doesn't influence me, doesn't help my apprehension a bit. Even if I can drink the water, if it contains high quantities of phosphorous, and nitrogen, and the other nutrients, and thereby encourages the production of vital plants and other bases of the food chain, this could make the areas that are influenced very greatly more productive, but it might be runaway production of the type you wouldn't want at all.

This frightens me to have this suggestion of millions of gallons of water poured into the estuary. I think before this is done, we must clearly find out what this might do to the existing communities down there.

Wouldn't you suggest this be put into the Gulf Stream or the Gulf to get it completely away from land? Is that what you're suggesting? This would be a far better solution in my opinion.

MR. THOMAN: Thank you very much, Dr. Idyll, and you're going to give me a statement, I hope.

I see Mr. Neff has returned. Mr. Frank Neff is representing Mr. Ellsworth G. Simmons, Chairman of the Hillsborough County Commission, Tampa, Florida. Mr. Neff.

MR. FRANK NEFF:

"We in Hillsborough County have recently organized a Pollution Control Commission. I am honored, indeed, that I have been afforded the privilege and the honor by my fellow Commissioners to serve as chairman on that Commission.

"My statement today will be in the way of a progress report, indicating what action and what we are doing about our local problem.

"We are convinced of the fact that the worst mistake we could make would be to proceed without having the knowledge associated with the sciences, the scientific innovations now being used by industry and their interrelationship with our natural environment.

"As we organized, as a Pollution Control Commission, we were fortunate in securing the services of a director who is eminently well qualified in his academic training, as well as his working knowledge of industry.

"We have instructed him to compile all of the scientific data available and to interpret that scientific data into rules and regulations, which could be correlated with the State of Florida and the federal government, in order that we could have a unified program.

"We have a very peculiar circumstance in Hillsborough County with our bay, inasmuch as our two major problems come not from industry, but they come from governmental agencies.

"The municipality of the City of Tampa has only primary treatment for their sewage disposal plant. I am proud to report that they have a definite plan in the form of a revenue bond issue to correct this condition, and it will take place sometime within the next three years.

"Strangely enough, the federal government in itself is the next greatest offender, inasmuch as they have a similar sewage disposal plant, providing for only primary treatment at MacDill Field.

"They have definite plans to go into secondary treatment, but strangely enough, the affairs in Vietnam are affecting us on this particular program as the result of the lack of funds.

"We in Hillsborough are convinced that the solutions to our problems should come from science, and that the implementation of the solutions should come from your governmental officials as administrators of law in your political subdivisions.

"It is going to take courage on the part of your local officials in order to get the job done, but those of us who find ourselves as administrators of political subdivisions frequently do not have the scientific background to come up with a scientific solution to the problem, and the sooner we recognize this and depend upon science to solve our problems, the better off we will be."

Mr. Chairman, I am available for questioning.

MR. PAUL TRAINA: Thank you, Mr. Neff.

MR. JENSEN: You must also have had the problem of zoning or planning for the effective use of your estuarine areas. How has the county gone about that?

MR. NEFF: As I have indicated, we are depending upon our director to accumulate this scientific knowledge available which is absolutely essential and mandatory to a successful solution.

May I give you an example. We are fortunate that today we have a research team, a federal research team, in Tampa Bay, and they are now making an analysis of the water, an analysis of the sewage and an analysis of the organic material in Tampa Bay and coming up with scientific solutions to the problem.

For any administrator, regardless of how dedicated or sincere he may be, to come up with the solution to the problem prior to the time that the scientific analysis and scientific solution to be presented could be presented for the solution of these problems, he would be presumptuous in presenting to you the problems of the scientists as compared to the problems of the administrators.

MR. TRAINA: You mentioned the federal research study that is going on in Tampa. How do you see it emanated through a local government like yours?

MR. NEFF: Because it is a local problem, but as we take advantage of federal funds to analyze the problem to give us the solutions, then it is my opinion that a strictly local problem should be handled by local officials.

A problem which overlaps political subdivisions should be handled by the next highest agency.

Permit me to give you a concrete example. We have in Hillsborough County a problem associated with the phosphate industry. This problem is universal and goes over into our neighboring counties.

I believe that this problem should be correlated with a state program and administered by the state, because to have other than a unified program would give us nothing but chaos and contention.

We must have a unified program.

MR. WAKEFIELD: Mr. Neff, in that regard, does not the drainage from adjacent counties also affect this problem in Hillsborough Bay, and, therefore, becomes involved in your program?

MR. NEFF: So far as the estuary itself is concerned in Tampa, this is entirely within Hillsborough County, and I would suggest that this immediate problem that you're talking about be handled by the local Pollution Control Commission.

MR. TRAINA: Thank you, Mr. Neff, very much. We appreciate your coming.

Next on our list we have Professor Charles R. Stephan, Chairman of the Department of Ocean Engineering, Florida Atlantic University, Boca Raton, Florida.

MR. CHARLES R. STEPHAN: Ladies and gentlemen: I appreciate the opportunity to make this statement regarding pollution in our nation's estuaries.

I have a prepared paper which I would like to leave, and rather than repeat some comments that have already been made, I would like to hit the high spots.

By way of introduction and qualification, I am Chairman of the Department of Ocean Engineering at Florida Atlantic University in Boca Raton. My professional background is almost exclusively associated with the deep ocean, first as a naval officer for 30 years with major assignments in Antisubmarine Warfare, research and development; and for the past four years as the developer and organizer of the first undergraduate ocean engineering program in our country.

I, therefore, come before you with "qualified" qualifications in the field of estuarine pollution. However, my concern is real, and anyone flying along the coast and looking down can see very quickly at any of the inlets, particularly those that come off the intracoastal waterway, to the southeast coast of Florida, you can see the pollution that has discolored the water going out into the clear ocean.

Not all the discolored waters that flush to sea are polluted, but too much of it is.

In my preparation for this statement, and in recognition of my limited knowledge of estuarine waters, I called upon four of my colleagues at

Florida Atlantic University for help.

We discussed their research in these areas. Therefore, I will be quoting them frequently and will make comments based on the results of their research.

My advisers were Dr. Edward DeLamater, Dean of Science, Florida Atlantic University; Dr. Harrison Hoffmann, Associate Professor of Microbiology, who is principal investigator of a pollution research project off Pompano Beach, Florida; Dr. Raymond McAllister, oceanographer in the Ocean Engineering Department, who is principal investigator of a Federal Water Pollution Control Administration project to conduct a demonstration of the limitations and feasibility of an ocean outfall system on the continental shelf; and Mr. Glenn H. Waddell, a biologist in the College of Science at FAU.

My comments cover an exchange of ideas with these authorities on the problem of estuarine pollution in the southeastern section of Florida.

First of all, I'd like to discuss the value of estuarine waters in our life and society today. There certainly ought to be clear channels for water drainage, breeding areas for fish, fowl and wildlife; and channels for navigation and in deeper waters.

There could be areas for farming or cultivation of fish and other aquatic food life, and places for conservation of wildlife. They are, in most cases, open sewers, breeding grounds for pests and insects and emergency drainage ditches to relieve flooded areas.

Frankly, they are, in many cases, a major source of contamination for our beaches, bays, inshore coastal areas and open ocean currents.

I would like to discuss one definite source of contamination of estuarine waters that can be stopped quickly if proper action is taken. That is the internal drainage of septic tanks into canals and streams caused by the simple installation of drainage lines from septic tanks to rock digesters near sea walls.

Simple chemical tests can be run in the canals to spot these contaminated drains. Once found, the owners can be ordered to plug them or face prosecution.

I don't think this is being done rather extensively. I have heard a lot of laws, statements, regarding controls of dumping of industrial wastes into our streams and estuaries.

Unfortunately, in many cases, they apparently are not being carried out. The control of wastes coming from boats in estuarine waters is a serious problem, which can and should be enforced.

Now, to get closer to my area of personal interest, the oceans, I can report to you that offshore tests, run by both Dr. Hoffmann and Dr. McAllister, show definite evidence of high enough levels of contamination to be serious to health by wastes discharged into the ocean from inlets such as the Hillsboro and Boca Raton inlets in southeast Florida.

This contamination extends at times to distances between one and one and one-half miles in the open ocean and covers the water of many beaches when currents or winds send these contaminated waters shoreward.

When, as happens too frequently, the Boca Raton inlet is closed by storm winds, the levels of contamination in the intracoastal rise rapidly and concentrated contamination exists at the open inlets.

With open inlets and regular tidal flushing, the contamination levels reduce, but they are serious in the populated areas of the intracoastal waterway at all times.

An indication of the contamination is the visibility in the waters, or rather, the lack of it, and the spread of this situation into the open ocean.

We have a submerged underwater laboratory in 50 feet of water about a mile south of Lake Worth inlet; one-half mile off the coast of Palm Beach.

Usually the water in the area is very clear and we can work easily in the daytime or at night with normal light.

In the intracoastal you can hardly see five to ten feet in bright sunlight and when the outgoing tidal waters flows south one mile to the Hydro-Lab, the visibility drops radically there also.

Here I would like to digress a little bit from my prepared text and perhaps open a Pandora's box, but I would like to discuss oil spills. In this, I have a little experience.

I was ten years ago the commanding officer of a Navy tanker. I don't know if many of you people know, but the captain of a tanker has a personal responsibility for an oil spill, and I can assure you that the captains take this rather seriously.

I did not have an experience with an oil spill, or perhaps I would have retired from the Navy a little earlier. (Laughter)

But I can tell you it was a matter of great concern. In the matter of oil spills and groundings, which we suddenly seem to have a rash of them -- three major ones within the last year.

Unfortunately, you can't legislate against accidents and human frailty. There are human elements here. You can't stop the transportation of oil by tankers, and they are going to get bigger.

They are going to be of greater depth and draft. In addition, the bigger ships are going to be much more difficult to handle than the smaller ships.

Ten years ago, the only thing we had in a ship to counter, or shall I say, decrease, the effects of an oil spill, were ionized sand, straw and sawdust.

We don't have much better than that today. In the loss of the Torrey Castle, they attempted to use the detergents. I'm not too sure that the detergents might not have caused more damage than the oil.

Actually, this is a field that I would like to recommend to the panel, that a great deal of research is needed, and I mean basic and immediate research to devise some means to control a spill when it occurs.

These spills are unfortunate mistakes, and mistakes will happen.

There is a second item that perhaps could have been avoided at places like San Juan, and it is being done in Hawaii, and that is the development of offshore moorings for the delivery of oil from large tankers.

This can be done and it is being done successfully off Barbers Point in Hawaii, and it can be done in other areas where the topography of the land adjacent to the harbor permits.

This would have to be done in a selected area, but it can be done. The direct problems in pollution, as I see them, are the unauthorized waste and raw sewage drains in the estuaries from sewers, industrial plants and boats.

Dr. Idyll gave a clear indication of the need for additional research in regard to thermal pollution. As he said, in some cases, it can be beneficial, but at least we don't know how much they are.

A support of this type of research is definitely in order. There must be better control in dredging and filling, and we must keep the inlets to the sea clear.

Now, what can be done? We must survey areas to find the sources of contamination and stop the unauthorized dumping of contaminants into the estuaries.

I make this next statement qualified, because I must admit I am not qualified, but it appears to me that full treatment of sewage is worth the cost in most places.

Perhaps the treated water, if it is not to be put back into the water, could be used to fertilize crops in the area. There are some good nutrients in sewage that could be used for crops.

I say I have heard about a lot of controls, but apparently, the enforcement of controls by qualified conservationists to review and recommend action on permits to dredge or fill estuaries should be enforced or increased.

This control board, be it local, state or federal, must consist of qualified practical men who will permit progress but stop destructiveness. They must be well qualified men who can act in the public's interest without exercising bureaucratic control.

Like motherhood, believe me, it seems to be necessary.

I think we must face facts in the matter of oil pollution, that oil pollution accidents can occur. I think the research and development to get the means to control it when it occurs, and enforce and require that these corrective matters or whatever it is -- it may be a liquid may be a solid, I don't know what it is -- that it be required to be carried on all ships and that they be stored in areas adjacent to important areas of population and could be used in an emergency. We do not have this today.

It requires research and development. Now, we must conduct research to develop new ways to dispose of wastes in the estuaries without serious pollution.

Long-range research and surveys are needed to determine the actual effects of the untreated sewage, waste heat and the changes they cause in the balances of nature.

In some cases, the changes can be beneficial and can be utilized to increase the productivity of marine life in the area. These surveys should include those areas of the continental shelf from which sewer outfall should be placed.

Long-range studies of the type now being conducted by the Florida Atlantic University, by the University of Miami, and by the Mote Marine Laboratories in the Port Charlotte area of Florida, are needed wherein an area which is essentially unpolluted now is studied in depth and repeated surveys made as time passes to see the effect of man-made pollution on the area as man moves in and industry establishes itself in the area.

From studies such as these, we can, perhaps, determine just what happens and take effective steps early enough to prevent irretrievable damage.

I suggest a research and development project to design and fabricate a direct and rapid reading device to show the levels of contamination, or comparative levels, in areas through which the sensor can be towed.

This, obviously, is necessary for rapid surveys of constantly changing areas suspected to be polluted.

And if there are good laws in antipollution, they should be enforced. Thank you.

MR. THOMAN: Thank you very much, Professor Stephan. Any questions?

DR. NICHOLSON: Do you have any idea what the dollar value will be for research, say, for the next ten years in the area of estuarine control?

MR. STEPHAN: No, sir. I'm afraid I would have to answer that the same as Dr. Idyll. I do not have that information.

MR. THOMAN: Would you like to make a guess and speculate for the record and send it to us later on?

MR. STEPHAN: Are you talking about for oil spills or are you talking about the whole estuarine problem?

MR. THOMAN: The whole estuarine problem. I think that one of the things that can come out of this overall study, hopefully, is a statement that could be given to the Congress as to what the level of research activity is going to be needed, without regard to who finances it, whether it's the federal government, state government, local, private or what-not.

Sooner or later, we ought to come up with some kind of an estimate.

MR. STEPHAN: I wish I were qualified to answer this as a scientist, but I'm not. But to start off with, it would certainly be several million dollars.

I'm not really qualified to make that estimate.

MR. THOMAN: Mr. Jensen.

MR. JENSEN: I wanted to mention, again, that we hope to have a major conference on research and study needs about a year from now. Perhaps you could give some thought between now and then as to the types of programs and the amount of money that might have to go into this ocean engineering aspect of it.

Certainly, much could be done to make the ocean transportation of hazardous cargos safer than it is now.

MR. STEPHAN: I agree with you.

MR. JENSEN: For example, the use of offshore moorage as a way of discharging cargo, although I think this is what was involved in the accident we spoke of earlier, an offshore moorage.

MR. THOMAN: Thank you very much, Professor Stephan.

Next I would like to call Mr. A. M. Davis. Mr. Davis is representing Mr. McGregor Smith, Chairman of the Board of Florida Power and Light Company.

MR. A. M. DAVIS: Mr. Thoman, gentlemen, I certainly thank you for this opportunity to give this statement of Mr. Smith's.

"Florida Power and Light Company serves approximately three million Floridians -- about half the population of the state.

"These citizens have an important stake in the use and future development of our state's estuarine resources.

"Just as we are aware of our responsibility to provide good electric service and to be a good corporate citizen, our company feels a strong obligation to support that type of program which will manage these resources in the best interests of the people of Florida.

"For these reasons, it is our opinion that the National Estuarine Pollution Study now under way should have as its foremost consideration that which is best for the overall good of the people.

"It is true, of course, that many estuaries should be preserved and protected for the benefit of marine life and wildlife. Estuaries, like people, are different, however, and no general rule of thumb can be applied to all.

"Each must be evaluated on the basis of its individual qualities and characteristics.

"In the study now being conducted by the Department of the Interior, the assumption is that estuaries have high economic and social value.

"We do not believe that this can be true of all estuaries. A proper and more realistic approach would seem to call for a study of estuaries in order to designate those which have high social and economic value.

"The state and local governments could then set up necessary controls, with the federal government furnishing such information as it might develop which would be useful to these governing bodies.

"Those estuaries designated for protection could then be preserved by either outright purchase or necessary zoning.

"In any case, the value of the general overall development of the community should be carefully considered and properly weighed in reaching a decision on the use of estuarine zones.

"Many uses of estuarine waters are actually essential to the welfare and progress of our civilization. While the protection of fish and wildlife is important, certainly the protection and advancement of human beings should not be ignored when considering this subject.

"In the heat of the many efforts now under way to protect our natural environment, we must be careful not to do the wrong thing for the right reasons.

"For example, if the rigid policies now being advocated by some had been in effect prior to 1900, dredging along our coastline might have been prohibited and we would have no Miami Beach -- formerly a mangrove swamp -- Miami, Fort Lauderdale and the other wonderful tourist cities which last year brought to Florida well over 18 million visitors -- a more than four-billion-dollar boost to the economy.

"If the agricultural industry were not permitted to use chemicals to control various insects and pests and to kill off unwanted vegetation, this important facet of our economy probably would not have developed; and yet, some pollution is a by-product of this process.

"Therefore, when considering the value of estuaries, value on the overall net benefit to the people must be considered, whether in the field of conservation, industrial progress or agricultural development.

"The various values must be balanced and drawn into proper perspective. Certainly no burdensome and unnecessary restrictions should be placed on developments which are absolutely essential for the future growth and welfare of our society.

"Our company is strongly in favor of conservation and we constantly practice and promote activities along this line.

"An example of these efforts is our Turkey Point plant site which has been developed into Dade County's largest natural park and conservation area.

"At Turkey Point, 3000 acres of mangrove swamps have been preserved for a wildlife sanctuary. Experimental ponds for growing shrimp have been constructed for the Marine Institute of the University of Miami.

"There is a Girl Scout Camp and a Boy Scout Camp, as well as a public recreation beach.

"The large intake and discharge canals are used by the United States Air Force for the operation of the only sea survival school in the country, and the use of this property costs the government nothing.

"Our feelings are just as sincere in regard to conservation practices for our estuaries. At the same time, we feel that users of electricity have just as much right to the economic benefits from the use of these waters for the delivery of equipment, fuel and for condensing purposes, as does a boat owner carrying cargo or a fisherman fishing.

"Our primary concern is doing what is best for everyone. We strongly feel that every proper, reasonable and intelligent thing should be done to hold down the cost of electric service for the benefit of our customers and to further promote the development of our state.

"It is our hope that in making this study, the Department of the Interior will seek goals that will assure all members of the public the rights they deserve."

Thank you.

MR. THOMAN: Thank you very much, Mr. Davis. Do you have any questions, Mr. Jensen?

MR. JENSEN: Mr. Davis, you have put great stress on the multiple-use concepts of the estuaries, and I guess as a dedicated user of air conditioning, I have to agree with the important use of power and the great need of quantities of power.

How do we go about making these public choices? How do we go about figuring how to get multiple uses out of these estuaries?

MR. DAVIS: Well, it will take a lot of study and research. As. Dr. Idyll stated, there is much we do not know about this subject, and it will just take the cooperation of industry, the government and the public to come up with these.

MR. JENSEN: Do you have any thoughts on zoning or community planning as such?

MR. DAVIS: I would think that zoning is an effective method of dividing up or apportioning the use of estuarine areas.

MR. THOMAN: Thank you very much, Mr. Davis.

I would next like to call Mr. Barry Crim of the DeLand Chamber of Commerce.

MR. BARRY CRIM: Mr. Chairman, ladies and gentlemen: I am not an ecologist, and I'm not an economist. I mean, I have no specific background in terms of doing anything of a professional nature about water pollution.

I am an attorney, and I am now a management consultant. At the time the DeLand Chamber of Commerce suggested that I do a little research on the question of water pollution, I thought that I had a very dull and unimaginative subject.

But, brother, when I got into that subject, I got scared, and the "scareder" I got, the more interested I became. I think that not only from what you have heard, but from what you will hear, no doubt, later on in this meeting, there will be enough generated by all thoughtful people so that we can and will take action that is needed to abate or arrest this terrible condition of water pollution.

I would like to read just very briefly a little bit of the research that I did on this question. I am not going to give you my opinions. I'm going to give you the opinions of experts, and most of what we were attempting to do in this report was that of really getting people to see the problem that confronted us.

In the "United States News and World Report" of July 15, it was reported that 40 percent of the United States population is drinking water and using water that has been used in other homes or by industry and later discharged as sewage as much as five times.

I think this is a condition that the average person does not realize. Also stated was this, that water pollution by modern detergents, which are supposed to decontaminate water, is the most common cause of public complaint.

Here the detergents become almost as obnoxious as the sewage itself. This has been stated to you before, and, of course, I guess in a thing of this kind, it's a little difficult to keep everything completely separated, but I will attempt to get through just as fast as I can.

In areas where homes discharge sewage into septic tanks, the detergents often seep down into underground water and later are pumped into wells for human consumption.

This, again, has been said, but I think it's just like any truth or any adage, it cannot be said too often if we are going to attempt to preserve our civilization.

In Wisconsin, as an example, tests showed that some of this underground water in 64 of its 71 counties was polluted. Now, if this is true in Wisconsin, it no doubt is very, very much true in many, many other states in the United States.

Since water pollution is an interstate problem, in other words, water from one stream flows from North Carolina into Georgia or from any other state into another state, then, of course, what we are talking about here that has happened in some other state can very easily be happening in our own State of Florida.

In the "U. S. News and World Report," September 16, 1963, with an interview with Dr. Luther L. Terry, head of the U. S. Public Health Service, the following facts were disclosed.

The problem of reusing water from lakes is more serious than reusing it from rivers. As we all know, rivers finally discharge their pollution into the ocean, whereas lake water remains in the lake and constant pollution completely changes the character of the water.

And he gives Lake Erie as a very sad example of that situation, which has become, as he said, "a stinking pot of filth," rather than a place of beauty as it had been just a few years ago.

Now, here's something that might perhaps be of interest to you:

"In 1963, more than 1500 communities composed of 13 millions of people were dumping untreated sewage into their streams."

Think about that maybe for a second.

"Another 1500 were discharging inadequate treated sewage of 17 millions of people into their streams."

Here's something else maybe.

"More than 2700 small towns in the United States composed of population areas of six millions of people did not, in 1963, even have sewer treatment facilities."

Now, we get to the question of foods that we eat out of the streams and waters. In the "New Republic" of January the 4th, 1964, issued, they were talking about the conditions in New Hampshire with reference to oysters.

The New Hampshire Fish and Game Department reported in October that six people had come down with dysentery from eating raw oysters taken from Great Bay, New Hampshire, whose water was polluted.

Also, many cases of hepatitis have been reported from eating shellfish in other areas.

Now, I have a few other things, but I will get right to this, because I know the time is short. Here are two generalized solutions of the problem that I finally got around to finding.

The experts that I have just quoted in the "U. S. News and World Report" of July 15, suggested, since the amount of water in the United States is remaining constant -- I don't know whether that is true now or not -- it may not be remaining constant.

We may be in a state of depletion of water, but anyhow, that is what was said there. And the industrial growth is rising rapidly. The only solution might be the desalting of sea water for family use on a large scale.

All right. In that same article from the "U. S. News and World Report," on July the 4th, 1965, Secretary of the Interior Stewart Udall was interviewed on the question of water pollution by "Meet the Press."

His solution was that all commercial fishing or others who regularly polluted streams or lakes should have a special tax levied on them that would be so high that they would stop polluting the waters.

Now, of course, as I said, these are generalized solutions, of course. I mean, because I have no background or no information whereby I could go into a specialized type of even suggestion of thought.

But here is one thought that I would like to leave with you, ladies and gentlemen. The question has come up here as to how much money should be spent for research and for other administrative purposes in doing away with water pollution, in abating it.

That, again, is a question that I absolutely cannot answer, but I can say this, and I'm speaking for myself now, not for the DeLand Chamber of Commerce, but in my opinion, if we can spend billions and billions of dollars trying to send somebody to some nebulous place called the moon, we ought to be able to spend a few billion dollars trying to keep life here on this earth for those people who are going to follow us, follow our children.

After all, it's your generation and mine that have polluted these waters. We brought these youngsters into this world, and I think that we have an obligation to them much greater than putting a man on the moon, to at least give them a chance to survive. Thank you.

MR. THOMAN: Thank you very much, Mr. Crim. Do you have a statement there which you wish to submit for the record?

MR. CRIM: Yes.

MR. THOMAN: We will incorporate it into the record.

Next we will hear from Mr. James Redford, Izaak Walton League, Miami, and he will be followed by Mr. Hooks.

MR. JAMES F. REDFORD, JR.: I had prepared a statement, but I feel at this time it would be somewhat redundant, particularly with the scientists and the political people that have gone before me.

I have revised it, so therefore, I will have no written statement to submit. I would say that Florida, or at least in our experience in the past eight or ten years, is awakening to the fact that its natural resources are declining.

The last session of the Legislature showed a certain awareness of this, particularly in the passing of the Randall Bill, which was a revision of the method of the disposal of submerged land and the fact that there was a pollution control law and an agency to enforce it created.

To this extent, we are proud of our state, or in this case, my adopted state. However, I am not a bit deceived by much of the talk of how Florida is going to be able to do it all, and I am not convinced that we can exclude the federal government as many people have spoken at many of these meetings; but at previous meetings I have attended, have been fond of saying the Randall Bill would not have passed the Legislature if it hadn't been the threat of the Dingle Bill in the House of Representatives, HR25.

There probably would have been no meeting here today to talk about water pollution and so forth if there had not been a Water Resources Act of 1965.

I just might point out that many of the people here today representing industry would not be testifying at such a meeting -- they would be quietly going on or not obeying whatever pollution laws existed in the State of Florida.

Now, I want to illustrate a point in this. We in the southern part of the state here, coming from Miami, have been on a problem in Dade County probably since 1961, in attempting to save what we consider and which has been an invaluable estuary, namely, Biscayne Bay.

First an oil refinery wished to locate on the bay, and it went all the way through. It went through county government. It went through state government.

It looked as if we were going to get it. We had an election, and things were slightly changed. Now, as of this month, I believe it's next week, March 22nd, we will have a hearing before the House of Affairs of whether the offshore island and adjacent bays and adjacent outside waters out to the 60-foot depth will become a national monument.

We hope this goes through. Now, this was first proposed in 1963, but now comes a power plant, now under construction, or partially finished, on Biscayne Bay, and we now have a problem of thermal pollution.

This license was granted to the Florida Power and Light Company to put this atomic plant on Lower Biscayne Bay. This, incidentally, is probably within two miles of the proposed national monument.

If you want to put a value on estuaries, you might say the appraisal of this estuary made by the federal government for acquisition purposes was in the vicinity of 25 million dollars.

Now, certain information was presented to the AEC for the construction of this plant, namely, certain title information. In the same report, it was contradicted by the U. S. Geological Survey.

There was a certain thing they were talking about, maximum permissible concentration of radioisotopes, and this was brought up by the U. S. Fish and Wildlife Service that this was fine, that you could drink it.

But what about the odor in the air? What about other crustaceans? Does this thing store up in the animals that live in the bay? Nobody knows.

As Dr. Idyll has said, more research is needed. Much more is not known than is known. Further than this, the information finally came out of how much water we are talking about.

We are talking about 2.3 billion gallons of water dumped into the bay daily. This water is at approximately ten degrees Fahrenheit above whatever existing average temperatures are in the bay.

And this was -- if you like to play with figures -- take a football field, say, 100 yards long and 33 and a half yards wide, and say this is a bottom of a tank; in one hour, this tank would be filled 19 stories high.

It would not be a safe place to go diving around the intake of such a pipe. Now, consider the fact that this bay has a tide of about 1.8 feet -- our point is this, we don't know what we want in research.

We do want research to find out what will happen if this is done. We are sort of in a position of criminal law. The bay is possibly condemned. We have a reasonable doubt.

In the case of a reasonable doubt, it should be resolved that in the case of the defendant, and in this case, I believe it would be Biscayne Bay -- I bring all this up to point out that -- Mr. Davis, who preceded me by two, was talking about the heated efforts of conservationists.

I am saying we are more concerned with his heated efforts down there in Biscayne Bay. What I'm trying to point out here is that although our state government has come a long way towards conservation, we must remember, as Secretary Udall said, "A lost conservation battle is lost forever."

It's not a baseball game, where if you don't lose too many of them, you can win the pennant. You have lost it.

Without, in this case, the federal government setting up minimum standards as they have in water control, and as we hope they will do in estuarial protection, I don't think the State of Florida would be able to pass enabling legislation which has saved much of our estuaries already, although a few have gone by, and those that have gone are gone for good.

In other words, I have said this: I think the solution to probably all states, but particularly Florida's problem, is for the federal government to continue to set up these minimum standards, much as my home county, Dade County.

The minimum standards of zoning are set up by the county and must be met at least as a minimum standard by all the municipalities therein.

I might say this, I agree with Dr. Idyll and the other scientists who have appeared here today, that more research is needed. However, I would say one other thing, that enough research has been made for us to know the estuaries are valuable and must be preserved, and we can't wait for research to preserve them. Thank you.

MR. THOMAN: Thank you very much, Mr. Redford. Are there any questions?

MR. JENSEN: Yes. The Federal Water Pollution Control Act, I think, was probably instrumental in encouraging many of the states to use classifications for their coastal waters.

Do you think some similar approach might work in terms of general land-use planning for the coastal strip of the United States?

MR. REDFORD: The answer to that is twofold. I was fortunate enough last year to go to Washington for the Dingle Bill hearing, and I had a chance to talk to Dr. Dingle, and he felt although the bill at that time had not set up a minimum standard for the state, that he thought that some form of a zoning or form of minimum standards would probably have to be compromised if the bill were to pass.

Obviously, it hasn't passed as of yet. I understand it is not in too good shape. I am also fortunate enough to have a wife who has a second cousin, I believe it is, who is also a good friend of ours, who was formerly the head county commissioner at Monterey County, Monterey, California, and he had -- there is a rather unique committee there.

This is in Carmel. It's a wealthy community, as you know. They have set up a whole series of standards, for example, no billboards and all this sort of thing, and they are given tax breaks.

I suppose this would have to be done on a local level as was done in Monterey County. I am troubled with our local zoning in Dade County.

MR. THOMAN: I agree with you, Mr. Redford. The federal government doesn't want to get into local zoning. Thank you very much.

The first speaker this afternoon will be Dr. Andrew McErlean of the Natural Resources Institute at the University of Maryland, who has quite extensive research to report on thermal pollution.

Next I would like to call Mr. Homer Hooks, the Executive Director of the Florida Phosphate Council, from Lakeland, Florida. Mr. Hooks.

MR. HOMER E. HOOKS: Thank you, Mr. Thoman. I am Homer E. Hooks, Executive Director of the Florida Phosphate Council, Inc., a trade association of 12 phosphate companies in Florida.

The companies which are now members of our Association are Agrico Chemical Company, Armour Agricultural Chemical Company, Borden Chemical Company, American Cyanamid Company, Farmland Industries, Inc., W. R. Grace and Company, International Minerals and Chemical Corporation, Mobil Chemical Company, Occidental of Florida, F. S. Royster Guano Company, Swift and Company and Central Phosphates, Inc.

Certain of those member companies were invited by your Regional Director, John R. Thoman, to present a statement at this public meeting.

Rather than present statements by the several member companies who were invited, which would largely be repetitious, the Florida Phosphate Council will present one concise statement setting forth the overall position of the Florida phosphate industry.

While this position reflects the consensus reached, certainly I should state for the record that under our bylaws, each member company is free at any time and on any issue to take a position or adopt a course of action as its own completely or partially at variance with that of the Florida Phosphate Council.

We have reviewed the Clean Water Restoration Act of 1966, calling for a comprehensive study of pollution problems in the nation's estuaries. We recognize that this study is only one facet of an overall national war on pollution.

With specific regard to estuaries and estuarine zones, it should be noted that the operations of the phosphate industry are located quite remotely from the areas under study.

The Clean Water Restoration Act places the responsibility upon you to analyze the important estuaries and the effects of pollution upon them; to discuss the major economic, social and ecological trends occurring in the estuaries and to make recommendations for a national program to preserve, study, use and develop estuaries.

We also note that the introduction section of the National Estuarine Pollution Study enclosed with your invitation also recites that "The technical aspects of pollution control and water quality enhancement in estuarine areas are infinitely more complicated than in fresh-water rivers and lakes."

Since the great bulk of our industry is located many miles from the estuaries of Florida, we must frankly admit that we have very little knowledge about estuaries.

This limitation of knowledge does not, however, prevent us from clearly stating our attitude and role in the general subject of water pollution.

In historical perspective, we note that the trend is for industry to become increasingly aware of and responsive to the pollution problem. Unfortunately, this has not always been the case.

In early years, industry's attitude toward pollution control was not as progressive as today. As the detriment of pollution came into clearer focus, industry has come to realize that controlling pollution is not only in its own best interest, but is a sound investment in the future.

Industry's attitude has thus shifted to positive action to control pollution, and top management in most industrial corporations today is committed to work for the cleanest water possible within reasonable economic and technological limits.

This new perspective by management is manifest by the extensive involvement of industry today in efforts to control the pollution problem.

For example, in many states, industry representatives now sit as members of the governmental agencies responsible for pollution control; industry spokesmen voluntarily appear before pollution control agencies and offer constructive solutions to the problems presented; studies and research are being conducted all across our country which are jointly financed by industry and government; most industry trade associations now have committees studying environmental problems.

Our own Association has committees studying the problem; in particular, the Waste Control Committee and the Technical Subcommittee on Effluent Control.

In recent years, large corporations have become increasingly concerned about their corporate image. They have realized that public acceptance is a valuable corporate asset.

A portion of that corporate image is certainly determined by the company's attitude toward pollution control. Enlightened industry now realizes, we believe, that it pays to abate pollution.

Our industry has adopted the philosophy that the public waters of our state are not to be used as open sewers for the indiscriminate disposal of industrial wastes.

Our record of expenditures and affirmative cooperation bears this out. The Florida phosphate industry alone has spent over 48 million dollars on waste control equipment which costs over six million dollars per year to run.

To pinpoint the specific expenditures for water waste control equipment, we have spent 19 million dollars in capital expenditures, and this equipment costs approximately four million dollars per year to operate.

In addition, there are water control systems and equipment now on order or being installed which will cost another three and a half million dollars.

As an example of our cooperation, approximately three months ago our industry was visited by Drs. H. Page Nicholson and David Hill of the Federal Water Pollution Control Administration, Southeastern Water Laboratory, located in Athens, Georgia.

They requested that we allow them to personally inspect our phosphate mining operations in a preliminary study of any pollution problems created thereby.

They spent approximately two days in the phosphate area, and we voluntarily arranged for them to have free rein to go any place they chose within the operations, make any study or evaluations they deemed helpful and provided them with transportation and an experienced engineer to act as a guide and explain any questions they might have.

We followed up this study by further correspondence with Dr. Nicholson and sent him certain requested technical data.

As you are no doubt aware, the State of Florida submitted to the Federal Water Pollution Control Administration our state's proposed water pollution standards.

Certain amendments to these proposed standards were requested by your office, and a public hearing on the requested amendments was held by the Florida Air and Water Pollution Control Commission at its latest public hearing in Tallahassee on February 20, 1968.

The public hearing was not completed and was reconvened on March 4, 1968. At the public hearing, the phosphate industry did not have any objections to the federally requested amendments and requested only one point of clarification, which seemed agreeable to the agency, its attorneys and technical experts.

We trust that the foregoing illustrates the constructive philosophy now adopted and pursued by the Florida phosphate industry.

Recognizing the limitations of our knowledge regarding the unique ecology of estuarine areas and our remoteness from them, we, nevertheless, felt that you were entitled to a statement of our position and philosophy.

We want to assure you that this philosophy will continue, and you may expect all reasonable cooperation from our industry. Thank you.

MR. THOMAN: Thank you very much, Mr. Hooks. Dr. Nicholson, do you have any questions?

DR. NICHOLSON: No.

MR. THOMAN: Mr. Jensen?

MR. JENSEN: No.

MR. THOMAN: I would next like to call on the original advertising for the Hathaway shirt, the Honorable Dr. Fred A. Eidsness, a consulting engineer, Partner, Black, Crow and Eidsness.

DR. FRED A. EIDSNESS: Mr. Thoman and fellow conspirators: This firm has, for some time, recognized and concurs with the objectives of the Clean Water Restoration Act of 1966.

Jack, at this time, I would like to throw a bouquet at your group, because I believe it is because of the policy of the secretary that this program is being implemented by professionals and you are able to set up and assimilate all this information from this testimony and then come up with some recommendations, which I feel have got some meat.

I think this program has been going well, and I think, again, you people who are administering it should be complimented.

Florida has literally thousands of miles of estuarine water frontage. This state, perhaps more than any other, obtains great benefits from these bodies of water for recreation, sport and commerce.

Yet the pressures on these native estuaries for development, alteration or use as receiving areas for waste-water effluents is increasing tremendously as Florida's new population seeks these desirable sites.

The role of the consultant in planning for waste-water treatment and disposal is expanding. He is obliged to give increasing weight to the questions of the content of products of waste-water treatment, location of the effluent outfall, and effect of effluent on the ecology of the receiving area.

Once in history, it was considered sufficient for the engineered system to collect, treat and discharge biologically "purified" waste waters into a nearby tidal body of water.

Today -- and increasingly tomorrow -- the consultant is facing the challenging additional responsibility of studying the community environment.

He must analyze the content of effluents produced by the various waste-water treatment processes.

He must consider the ecosystem of receiving waters and effect of introducing varying types of effluents upon it. He must analyze alternate discharge possibilities against a yardstick made up of engineering, ecological, financial and community considerations.

This is a challenging engineering responsibility, but it is a satisfying one. It should be helpful to cite several current examples.

We are deeply involved in determining the ultimate type of waste-water treatment and effluent disposal of a leading Gulf Coast resort city, which will preserve adjoining estuary waters and perhaps even add to the sum total of this community's natural attraction.

This continuing program begins with elimination of septic tanks, providing adequate pumping and transmission facilities, and constructing treatment works of proven ability for minimizing organics and nutrients.

Studies are being made on feasibility of ground-water recharge of effluents. Basic study of this estuary is sorely needed, since pollution is not usually limited to domestic wastes alone, but to agricultural uses of the watershed.

The engineer is trained to recognize cost-benefit ratio, but the day has arrived in many communities where the people, speaking through their duly elected officials, may wish to determine benefit, since they pay cost.

Early in 1966, privately owned lands in a 2600-acre estuarine area located in Collier County in southwest Florida Gulf Coast, was acquired and vested in the National Audubon Society.

Since that date, additional properties have been purchased, the area now totaling 4000 acres. This area, separated from the Gulf by a narrow barrier island, is a mix of land and water, consisting of Rookery Bay, several small bays, numerous creeks, plus a substantial amount of adjoining mainland.

The purpose of this acquisition was to preserve this area in its natural condition so it may continue to serve both conservation and recreation interests.

As privately owned coastal lands in the vicinity are urbanized, Rookery Bay Sanctuary is intended to remain a meaningful sample of natural conditions which preceded urban development, a publicly accessible marine park, which provides pleasure to both its users as its viewers, a producer of, and host to, a variety of bird and fish life.

The sanctuary is not a self-contained ecologic unit and can be adversely affected by actions on nearby privately owned lands.

Because of concern about wholesale conflict in this country between conservation and urbanization, the Conservation Foundation, with funds made available through a Ford Foundation grant, is sponsoring a program designed to develop ways and means of resolving the conflict and of building results of its efforts in the country's urban development processes.

We are privileged to be consulting engineers to the Conservation Foundation on this important program.

We cite this example to you, since it represents a case in which private funds were obtained to acquire the land and private funds, through foundations, as sponsoring a study which should result in meaningful answer to the problem.

The continual problem of intrusion of salt water into Florida's freshwater supply is still evident. Although appropriate actions have been taken in many instances to establish salinity barriers, this problem is far from solved.

We can cite as one example salt-water intrusion into the fresh-water side of the Caloosahatchee River through lock operation at Olga Dam. The river serves as raw water supply for both the City of Fort Myers and the Lee County water system.

Discussions are presently being conducted in order to eliminate, or at least minimize, this particular problem.

Construction of dams on many estuaries is required, not only to prevent salt-water intrusion into fresh-water supplies, but for regulating discharge of fresh water which is needed to promote proper marine growth.

We believe that the program that you are conducting is extremely important, particularly to this state with its many miles of shoreline. It has been a privilege to bring these matters to your attention.

I will be glad to answer any questions that you may have. This is the first time I have attempted to read a statement with one eye and trifocals, and I don't think I'll try to do that again.

MR. THOMAN: Thank you, Fred, very much. Vince?

MR. PATTON: I wonder if Dr. Eidsness has any estimate of the amount of money needed for research.

DR. EIDSNESS: I think, Vince, you're talking in the upper limits of the millions. I don't think you're quite approaching the billions yet.

But I think one of the problems we are facing here is someone in my business, in a lot of cases, is unable to come up with the answers, because there is insufficient basic research of the problem as a whole.

You find yourself where you have got to use judgment. Another doctor who spoke earlier, who has a name somewhat similar to mine -- I almost got up when you introduced him -- made the statement that in the field of ecology, they are still searching for some of the answers, and I believe that we have got to rely on the problem of ecosystems in order to, or not the problem, but what is the ecosystem, and how we can maintain it, before we can really come up with some of the answers.

I believe that a great deal of basic research has to be done.

MR. THOMAN: Thank you very much. Gene.

MR. JENSEN: Doctor, how far do you think we can go in this concept of multiple use of estuaries? We, in fact, make conservation compatible with water transportation and some industrial use.

DR. EIDSNESS: This is like asking me to stop beating my wife. I think we can. I have found -- I was trained along the line of cost-benefit ratio. I think my livelihood and my experience has been in the field of engineering, although my education pursued chemistry and biology, so I think I understand some of the problems from all sides.

I think these people can live together. I think there has to be a determination by the people in a particular area as to what they want. The only thing that sometimes is disturbing is that -- I have seen in some places where the large cry has been of upgrading influence and providing a situation which would not change the ecology of the area.

This same body that is doing this also controls the rate structure of utility companies in the area, and I think we all must realize there are two sides to the coin, and if you're going to upgrade and spend more money, there has to be someone to pay for it.

I believe your idea of zoning would probably be a method by which you could control this, because this is really the fundamental which is going to control the situation anyway.

I think in the future we have got to have compatibility.

MR. JENSEN: Thank you, Doctor. One of the items that was brought out at our hearing in Georgia was the problem of using the information that we have now.

Someone pointed out that a water information service has recently been established. I believe it's operated through Water Resources in the Department of the Interior.

Do you feel, or do you think, a similar information system would be desirable for the estuarine sciences?

DR. EIDSNESS: Yes, I do. We have tackled some, and I think my firm has got a pretty good smattering of scientists.

One of the biggest jobs that we have in order to tackle the problem about which you're speaking is to gather all this information which is already available before we can even start on what we are trying to do.

Even then we find some holes that have to be plugged in order to come up with a total answer.

MR. THOMAN: Thank you very much. I would next like to call on Mr. Thomas B. Ard, who is representing Mayor Hans Tanzler of the City of Jacksonville.

I would like to read into the record the following statements that have been submitted: We have one from Charles C. Sweglaer, III, of the Orlando Chamber of Commerce; a statement from Charles E. Davis, Jr., a member of the Florida House of Representatives, Vero Beach; a statement from Mr. Bolivar F. Hyde, Lakeland, Florida; a statement from the War on Weeds Society of Crystal River, Florida; a statement from Mr. Charles D. Schilling of Jensen Beach, Florida; a statement from William K. Robertson, soils chemist, University of Florida, representing the American Institute of Chemists; a statement from Dr. Harry Ludwig, Arcadia; a statement from the Honorable Wilbur Willis, Mayor of Port Orange, Florida; a statement from the town of Kenneth City, Florida, signed by Mr. David L. Alloway, Mayor; and a statement from the Tampa Bay Audubon Society President, Mrs. Dorothy Teschner; a statement from Shands and Barker, Inc. in Jacksonville, Florida; and a statement from the Utilities Commission of the City of New Smyrna Beach, Florida; a statement from the City of Lighthouse Point, Broward County, Florida; a statement from Southern Gulf Utilities, Inc., Miami, Florida; and a statement from Mr. John A. Oerting, Jr., Chairman of the Industrial Committee of the Niceville-Valparaiso Chamber of Commerce.

We also have indications that statements will be submitted by the Outdoor Writers Association of America; by the Jacksonville-Duval Area Planning Board; by the Florida Federation of Women's Clubs; and by the Reynolds Submarine Services Corporation of Miami, Florida.

Mr. Ard, excuse me, I didn't realize it was that long.

MR. THOMAS B. ARD: Thank you very much, Mr. Thoman. It's a pleasure to be here today to represent Mayor Tanzler and the City of Jacksonville.

I want to bring to you today a brief summary of the pollution investigation of the St. Johns estuary, which the City of Jacksonville has been conducting for about 14 years.

The St. Johns River rises in a swampy area about 50 miles north of Lake Okeechobee and flows north approximately 275 miles to the Atlantic Ocean, with a gradient of about 20 feet.

Generally, the river is 22 miles inland and parallels the seacoast. The drainage area comprises about 8000 square miles.

Tidal effects are felt regularly at Palatka and have been felt as far as Lake Harney above Sanford. The tidal fluctuations at Jacksonville average about 1.1 feet.

The river level in the tidal portion is strongly influenced by the winds, and, at times of long continual strong winds from the easterly quadrant, the level of the water surface at Jacksonville may rise between four and five feet above mean sea level.

The St. Johns is a river of great variability, and I am certain that even after 14 years of work on this river, I do not know all of the variables.

It is a mighty and dynamic river, at times sending thousands of cubic feet per second to the ocean, and, at other times, storing water in the basin with a negative net discharge.

It is an ever-changing river with all variables changing minute to minute and hour to hour.

The City of Jacksonville, at present, has an area of approximately 39 square miles with nine square miles of water and 11 miles of the St. Johns in the City of Jacksonville.

On October 1, 1968, when the new consolidated government goes into effect, Jacksonville will have a total area of 823 square miles, and 34.5 miles of the St. Johns will be in the City of Jacksonville.

Jacksonville exists today because of the St. Johns, and its future will be controlled largely by the St. Johns, as we develop our port and traffic on the cross-state canal.

So it is obvious that the city is vitally interested in this river. The city has a three-phase program of construction and planning for the correction of pollution of the St. Johns by city sewage.

On October 25, 1954, the City of Jacksonville made the first of five surveys on the St. Johns River. These large-scale surveys sampled the St. Johns at eight stations from Mayport to Orange Park.

Samples were taken simultaneously at eight stations every hour on the hour at three depths for a 13-hour tidal cycle. Five surveys were made at three-month intervals.

Due to the high cost and the analytical results, the eight-station program was cancelled at the end of 15 months.

In 1957, the city built a permanent sampling station on the north pier of the Main Street Bridge -- Station 5.

This station was equipped with three five-gallon-per-minute electric pumps to draw samples from two feet, 38 feet and 73 feet below the surface. The pumps are run continuously for a 13-hour tidal cycle, and samples are collected from the pump discharge.

On June 16 - 17, 1958, a 26-hour sampling was conducted at the Main Street Bridge.

Knowing that the city was constructing new sewers and a treatment plant at a cost of 17 million dollars to serve the northwest part of the city which had not been sewered previously, we started a program of 13-hour tidal cycle sampling at Main Street Bridge on June 8, 1959.

In addition to Main Street, we sampled at maximum flood and maximum ebb current at Drummond Point -- Station 3 -- Trout River, Port Authority Docks -- Station 4 -- and Arlington River.

We wanted to have some data on this portion of the river before the new sewage treatment plant went into operation on April 14, 1961.

On December 13, 1965, we sampled Station 1, Mayport, and Station 8 at Orange Park. We found conditions about the same as in 1955. This program has been in operation every 60 days since June 8, 1959.

From October 25, 1954, to date, we have taken 12,090 samples of the St. Johns and have performed 22,295 analyses.

Today the principal sources of pollution to the St. Johns in Duval County are:

1. City of Jacksonville. Approximately 15 MGD of raw sewage from 150,000 people.

2. Two mills discharging approximately 90 MGD with a population equivalent that has ranged close to one million people.

3. Petroleum products. Spillage from tankers and barges.

4. Debris. Through the years, the people have regarded the river as a means of getting rid of anything they did not want.

Faced with the pollution load, the results of the laboratory work become of interest.

First, let's take a look at the biochemical oxygen demand. The highest BOD occurred on June 10, 1963, when the average for the Main Street Bridge was 4.29 ppm at two-foot depth; 2.52 ppm at 38-foot depth; and 3.56 ppm at 73-foot depth.

On February 12, 1968, the BOD exceeded 2.0 ppm two times out of 42 samples. These values were 2.2 and 2.4 ppm. The low BOD for this day was 0.8 ppm. Generally, throughout our long-term sampling, the BOD is less than 2.0 ppm.

Second, dissolved oxygen. On February 12, 1968, the percent saturation of dissolved oxygen was a low of 77 percent (8.0 ppm) and a high of 88 percent (9.3 ppm).

Third, the most probable number of coliforms -- MPN. The lowest logarithmic average of 4414 occurred on May 22, 1955, and the highest of 41,132 occurred on December 14, 1959.

Fourth, chlorides. We check for chloride as an index of mixing and to determine the percent saturation of dissolved oxygen.

Chlorides have ranged from a low of 54 ppm at 11:00 a.m. on October 14, 1957, to a high of 14,900 at 3:00 p.m. on February 12, 1962.

There is intense mixing in the St. Johns, and the salt-water tongue of tidal estuaries is not pronounced. The difference in chlorides from top to bottom is generally in the range of a few hundred parts per million.

Fifth, color. The popular opinion in Jacksonville is that the color of the St. Johns is caused by the raw sewage and that the river will be as clear as Silver Springs when the sewage is removed and treated.

The color is due to the organics from the drainage basin and runs from 60 to 100 apparent color on the platinum cobalt scale.

The above five items refer to the Main Street Bridge, Station 5.

The city has had a cooperative agreement with the United States Geological Survey since 1954, for flow measurement at the Main Street Bridge.

The flow measurement shows wide variability. An average of 20 billion gallons of water moves under the Main Street Bridge each day. I grant you that some of these gallons are the same gallons, but there is this much water in motion.

I have tried to give you an idea of the variability of some of the parameters.

We have done a lot of work and accumulated a lot of data. We have contacted various computer manufacturers to see whether they had a "canned" program that we could plug the data into, but this was not available.

We have offered the use of this data to the University of Florida for use by a master's or doctoral candidate.

We have furnished one year's data to the Water Pollution Control Administration. We have all of this data and more on punched cards.

My purpose in being here today is:

1. To offer the cooperation of the City of Jacksonville in any studies of the St. Johns estuary by state or federal agencies.

2. To offer the accumulated data to state and federal agencies.

3. To suggest research in possible repellency effect on fish by industrial waste.

4. To suggest research and studies of current and motion in the St. Johns estuary.

There is a copy of this paper, and I have a card attached which, I assume, will be in the printed material.

MR. THOMAN: Yes.

MR. ARD: Also a map of the area showing the various sample stations. Thank you very much.

MR. THOMAN: Thank you very much, Mr. Ard, and your entire statement will be incorporated into the record.

Any questions, Dr. Nicholson?

DR. NICHOLSON: No.

MR. THOMAN: Mr. Jensen?

MR. JENSEN: What are the future plans in Jacksonville?

MR. ARD: Well, this seems to be the big question that we are asking for answers on ourselves. As you know, we become a consolidated government on the first of October, and we really don't have the answers on how we are headed.

As far as the pollution is concerned, the St. Johns will be relieved from the load of the City of Jacksonville.

The plans are being prepared now to intercept our same raw outfall and deliver it for treatment.

MR. JENSEN: How would you think a committee such as this might approach the problem of community planning, or zoning or land use?

MR. ARD: You have taken me out of my bailiwick on this. This is not my judgment to make.

MR. THOMAN: Thank you very much, Mr. Ard.

I would next like to call Mr. William Taft, from the University of South Florida, Tampa, Florida.

We will probably quit shortly before 12:30, and reconvene at 2:00 o'clock.

Mr. Taft.

MR. WILLIAM H. TAFT: The air we breathe, the water we drink and the land we till are some of our most precious possessions, yet we abuse these natural resources to the point one would believe they are inexhaustible.

Our urban populations, because of the need for most expeditious handling of large quantities of waste, are probably the greatest single source of contamination and pollution.

We cannot afford to resign ourselves to the belief that pollution is a necessary evil of growing populations that we must live with. Pollution of our resources will continue until such time as remedial legislation is enacted and strict enforcement is practiced.

We do not have to look far to see pollution problems. Within Hillsborough County we have a classic example. The geographic location of our main sewage plant at Hookers Point is unbelievable. At the headwaters of Tampa Bay, where water circulation is poor, we dump our treated sewage.

Although the following data are not current, they should provide you with a measure of what is happening and the rate at which the problem is accelerating:

Table 1. Average daily effluent for Hookers Point sewage plant:

	1952	1963
Flow (Million gallons/day)	12.66	24.42
Suspended Solids (pounds/day)	9,700	19,500
Biological Oxygen Demand (pounds/day)	16,100	34,000
Total Solids (pounds/day)	76,900	176,600

On a daily basis, these figures may not be too disturbing, but if we recalculate these figures on an annual basis, the problem should be apparent:

Table 2. Annual effluent from Hookers Point sewage plant:

	1963
Flow (gallons)	8,933,300,000
Suspended Solids (pounds)	7,117,500
Biological Oxygen Demand (pounds)	12,410,000
Total Solids (pounds)	64,459,000

These figures only reflect the major sewage plant on the bay. There are at least 40 additional plants that collectively account for more pollutants to the bay than the plant for which I have presented these figures.

Obviously, when the Hookers Point sewage plant was conceived, there was no consideration as to its effect on the Tampa Bay ecological system.

In 1968, we are adding customers to our service, talking about increasing the capacity of our plant, and at the same time wondering why the bay smells.

Unfortunately, the average citizen is not aware of the figures I have presented, nor does he understand the implications of such information.

I have cited this example, because I believe it reflects our complete apathetic approach to pollution and preservation of our estuarine resources. Interestingly enough, in the year of science, 1968, we do not know what constitutes a polluted estuary.

We generally determine pollution levels by coliform count, but this bacteria is only a means of determining whether or not we can safely consume certain organisms living in the habitat, or if we can safely swim in the waters.

Although we have a good idea of the quantity of material being dumped into our estuaries, we have little knowledge concerning the short- and long-term effects of these pollutants on the environment.

Let me cite some of the major variables that affect the total ecologic environment of estuaries. This list is by no means meant to be exhaustive, but it is intended to point out how complex is a complete understanding and appreciation of our estuaries.

An estuary can be divided into at least three components: physical, chemical and biological; with numerous supporting subdivisions as follows:

A. Physical factors affecting the estuary:

1. Dimensions and configuration of the estuary

2. Influx of fresh and salt water by rainfall, run-off and tidal action

3. Tidal energy

4. Circulation of water

5. Effects of storms

6. Temperature of water and variations

7. Flushing index time necessary to replace existing water

8. Quantity of sedimentary particles entering the estuary

9. Horizontal and vertical distribution of sediment particles

10. Annual variation of climate

B. Chemical factors affecting the estuary:

1. Natural chemistry of salt and fresh water flowing into the estuary and net chemistry after mixing

2. Variation of water chemistry as a result of storms, drought, et cetera

3. Additives from man, such as sewage, industrial wastes, agricultural products -- insecticides, manure, fertilizers, et cetera -- and interaction between particles in the air and water

4. Interstitial water chemistry and the ability of this water trapped in the sediments to become polluted by diffusion from above and to hold pollutants as a reservoir

5. Nutrients in the water for plants and animals

6. Dissolved Oxygen

C. Biological factors affecting the estuary:

Most of what has been cited above either directly or indirectly affects the standing crop of plants and animals and controls their ability to inhabit a particular estuary.

In addition, the bilogical community itself plays a major role in determining the destiny of an estuary. Examples are:

1. Reworking of sediments by animals

2. Growth of oyster bars and resulting decrease in effective water circulation

3. Red tide and resulting fish kills

4. Growth of plants that trap sediments and restrict circulation

5. Plant blooms and ensuing kills that result in large quantities of decaying organic matter.

Although not conveniently placed in our three categories above, one additional condition merits attention. Dredging of estuaries causes irreparable damage.

We know that various plants are restricted to various zones of water depth. If we remove sediments for fill and thereby increase the water depth beyond the range in which these plants can survive, the plants will never return to the environment.

Dredging may cause an increase in fines relative to the more coarse sedimentary particles, because the fines return to the estuary suspended in the run-off water.

These fines are then available to cloud the water and to choke plants and animals. In addition, dredging unnaturally stirs up the bottom sediments and places into suspension various types of organic matter that had previously been buried and therefore removed from the system.

We believe we are knowledgeable concerning the physical, chemical and biological parameters I have discussed, yet we are ignorant of the interrelationships between the parameters and how various combinations affect the plants and animals inhabiting the environment.

Without a comprehensive research program, no one can accurately measure the dollar value of our estuaries. We do know, however, that estuaries are as important to the total marine environment as streams are to lakes, moisture is to plant growth and wheat fields are to the bread industry.

Unfortunately, because we have ignored estuaries for so long, in many cases the natural value of estuaries cannot be restored economically.

Our estuaries are an irreplaceable natural resource of continuing economic importance. If left undisturbed, they are capable of regenerating themselves to usefulness after natural disasters, but if man has materially altered the environment, restoration is likely to be prohibitive.

At present, we are hampered in our attempts at knowing what good management of an estuary consists of, because of our ignorance.

Very little national research has been deliberately directed towards understanding the ecologic environment of estuaries. Typically, an investigator will look at certain phases of the ecosystem, but, because of the quantity of money required to do a comprehensive study, very few, if any, estuaries have been thoroughly researched.

Recommendations:

1. A national research program should be initiated that would have as its goal the complete understanding of the various interrelated components of our estuarine environments.

This research program should include such specific projects as:

a. Complete inventory of estuaries

b. Experimentation with introducing more desirable and more tolerant plants and animals

c. Replanting devastated grass flats

d. Economic significance of pollution legislation

2. Based upon the accumulated scientific data, local management boards should be established. Individuals appointed to these boards should not represent vested interests, but rather should gain membership because of their knowledge of the estuarine environment.

These boards should encourage passage of local ordinances and state laws to implement good management of estuaries. Some mechanism will also be required to provide strict enforcement of such legislation.

Proposal:

To implement the first of these recommendations, I propose that the U. S. Department of the Interior ask the Congress for authority and funds to establish estuarine research centers at those universities capable of and desiring to conduct research on the total estuarine environment.

During the last 20 years, the areas of most concentrated research at universities have been determined by availability of research dollars in federal agencies.

The problem of our estuaries is one that can be solved by such centers, just as the land-grant colleges have contributed so much to our agricultural competence.

MR. THOMAN: Thank you very much, Mr. Taft, for a very fine statement.

Dr. Nicholson, do you have any questions?

DR. NICHOLSON: I have two questions. First, what sort of a money effort would you recommend in connection with your estuarine research centers?

MR. TAFT: Before coming, I was going to put it in the statement, and now I wish I had, because I did give some consideration to this.

I think it would depend if we admit that most estuaries are different and it would depend upon the natural and the man-induced habitat. Then the amount of money you would want to become involved in this would depend on the number of centers you would establish.

I don't think you could establish a center for less than a half a million to a million dollars a year. So if you had 24 of those, it would be on a 24-million-dollar minimum.

DR. NICHOLSON: Are you talking about Florida alone or nationally?

MR. TAFT: I'm talking about places that have similar estuarine problems.

MR. THOMAN: If you would like to give some more thought to this and submit a statement, we will be more than pleased to include it in the record, Mr. Taft.

DR. NICHOLSON: The second question I have is that you have recommended local management of the estuaries. What sort of an overall management organization do you think is needed to coordinate the local management efforts?

MR. TAFT: Well, there is no doubt in my mind that we need national basic rules, because of the political environment. Actually, it consists of Hillsborough, Pinellas and Sarasota Counties as a minimum, and as a consequence, those three counties have had a great history of not being able to work for the common good.

It seems to me that one has to be faced with some minimum standards from the federal government that they would set up, and these would then be implemented locally.

MR. THOMAN: Mr. Jensen.

MR. JENSEN: You used the term, I believe, "local management board." Would you think that the same concept might also apply at the state and federal levels, that is, a President's Commission on -- or Governor's Commission on -- Estuaries?

MR. TAFT: Well, one could carry this so far that it would be very complex. I'm not so sure that we need too much more than scientific data to substantiate how to manage an estuary, and then, based on that data, on how to manage it appropriately.

So I am not so sure that a Governor's Commission, for instance, on estuarine management would be any better than the local management district, as long as they live within the scientific data collected and the recommendations they would dictate.

MR. JENSEN: The other question that I have relates to Tampa Bay, Hillsboro Bay. Would you care to comment on the effects of the various spoil islands and causeways on the circulation in that bay, those two bays?

MR. TAFT: In conjunction with the U. S. Fish and Wildlife Service in St. Petersburg, the University of South Florida, a few years ago, conducted a preliminary study to determine something about the circulation in both Hillsboro and Upper Tampa Bay.

There is no question in our minds that circulation, obviously, is severely restricted by spoil banks and by the causeways. As a matter of fact, in this morning's newspaper, in the metropolitan section, the first article I remember seeing concerned the results of the research program that Mr. Neff spoke of earlier.

That is, the people there are recommending that we cut channels into some of the spoil banks and remove them because they are obviously deflecting the circulation in the wrong way and impeding circulation.

MR. THOMAN: Thank you very much, Mr. Taft.

We will stop now and reconvene promptly at 2:00 o'clock.

(Whereupon the meeting recessed at 12:30 o'clock p.m.)

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TUESDAY AFTERNOON SESSION
March 12, 1968

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The public meeting directed toward obtaining contributions from Florida interests regarding the National Estuarine Pollution Study being conducted by the Federal Water Pollution Control Administration convened in the Granada Room of the Park Plaza Hotel, Orlando, Florida, Tuesday afternoon, March 12, 1968, and was called to order at 2:00 o'clock p.m. by Regional Director John R. Thoman, Southeast Region, Federal Water Pollution Control Administration.

MR. JOHN R. THOMAN: Our First speaker this afternoon will be Mr. A. J. McErlean, of the Natural Resources Institute at the University of Maryland, Solomons, Maryland.

Mr. McErlean and his associate, Dr. J. A. Mihursky, have been doing research for a considerable number of years on heat pollution, and we asked him to come here today to present testimony to this meeting on thermal pollution in estuaries.

Mr. McErlean, thank you very much for coming, and we look forward to your presentation.

MR. A. J. McERLEAN: Thank you very much, Mr. Chairman. It is a pleasure to be able to address this group concerning our study of the thermal estuarine ecology.

Dr. J. A. Mihursky, Chairman of the Department of Environmental Research, was unable to make this presentation, and I have been asked to substitute.

Our group has studied the effects of thermal pollution in the Patuxent River since 1962. Many people have contributed to this effort. However, time does not permit complete citation of all individuals.

Support of this reserach has come from Maryland's Department of Water Resources, the University of Maryland Water Resources Research Center (United States Department of the Interior), Department of Chesapeake Bay Affairs, Bureau of Commercial Fisheries, and the University's Natural Resources Institute.

I would like to sketch out briefly some of the background that went into these studies and enumerate some results from them.

(Hereafter Mr. McErlean's address was effectively illustrated with slides.)

MR. McERLEAN: Many publications have been concerned entirely or partly with the effects of temperature upon aquatic organisms under laboratory and field conditions.

Temperature is now known to be a very important lethal, directive and controlling factor in the aquatic habitat.

It is lethal in that certain high or low levels can directly cause mortalities; directive in that it influences daily and seasonal behavior; and controlling in that it affects biochemical reaction rates and, consequently, influences metabolic rates. It is indeed a master factor.

Maryland, like many of the southeastern states, derives much pleasure and profit from her water resources. Therefore, the necessity of assessing the effects of thermal pollution is obvious.

Thermal pollution is a by-product produced from power generation. Until recently, however, individual installations were small in size and influenced a relatively small segment of any receiving body of water.

In the past decade, however, it has become quite clear we are in a developing electric age. Electricity requirements are continually being revised upward.

We have seen estimates ranging from 32 to 256 times increase by the year 2010 from a 1960 base year.

Pertinent to our concern for the aquatic environment is the large volume of cooling water required by the new and larger power plants, especially nuclear plants. Such units may require over three billion gallons of water per day.

As a result of the above considerations, and also as a result of the need for specific information pertinent to a proposed change in Maryland's environment, we initiated a large-scale multidisciplinary research program on the Patuxent River estuary in 1962.

The study centers around a 710-megawatt coal-fired steam electric station (S.E.S.) that uses up to 750 million gallons of water per day, and, depending on pumping rates, heats the water 11.5 to 23 degrees Fahrenheit above ambient temperatures.

The field program investigates physical, chemical and biological aspects carried out by over a dozen cooperating state, federal and university departments or agencies. Our laboratory program began in January, 1966.

It is not possible to discuss all our research programs or their results in this brief discussion. Perhaps, in deference to brevity, it would be better to read some 13 selected titles of a possible 24 reports and publications that have resulted from the program.

As many of these items as seem pertinent can be made available to your group:

1. Mihursky, J. A. 1963. Patuxent River Estuary Study with Special reference to the Effects of Heated Steam Electric Station Condenser Water on Estuarine Ecology.

2. Mihursky, J. A., C. I. Gibson, V. Kennedy and W. Roosenburg 1966. Progress Report to 1 July 1966. Patuxent Thermal Study.

3. Mihursky, J. A., A. J. McErlean, W. Roosenburg, V. S. Kennedy and C. I. Gibson 1967. Progress Report Period 1 July 1966 - 31 December 1966. Patuxent Thermal Studies.

4. Mihursky, J. A. and V. S. Kennedy 1967. Water Temperature Criteria to Protect Aquatic Life.

5. Kennedy, V. S., J. A. Mihursky 1967. Bibliography on the Effects of Temperature in the Aquatic Environment.

6. Mihursky, J. A. 1967. Interim Recommended Regulations for Steam Electric Stations in Maryland.

7. Mihursky, J. A. and L. E. Cronin 1967. Statement concerning the Temperature Recommendations in the State of Maryland's Department of Water Resources draft entitled "Water Quality Criteria and Standards."

8. Mihursky, J. A., A. J. McErlean, W. H. Roosenburg, V. S. Kennedy 1967. Progress Report Period January 1 - July 1, 1967. Patuxent Thermal Studies.

9. Mihursky, J. A. and L. E. Cronin 1967. Progress and Problems in Thermal Pollution in Maryland.

10. Mihursky, J. A. 1968. Statement on Environmental Research to the Senate Subcommittee on Air and Water Pollution, February 6, 1968.

11. Mihursky, J. A. 1967. On Possible Constructive Uses of Thermal Additions to Estuaries.

12. McErlean, A. J. and J. A. Mihursky 1968. Graphical and Mathmatical Analysis of Species Diversity and Abundance.

13. Resolution of the Maryland Board of Natural Resources concerning Public Utility Operations in Maryland, 1968.

Due to the location of the intake and outfall structures and the nature of an estuarine system, the heated water may, at times, sink below the water surface in the receiving area.

Subsurface heated water distributions may effect benthic populations. Inversions of this type undoubtedly retard cooling which depends on surface distribution for maximum heat exchange with the atmosphere.

I should add, parenthetically, this is not predicted in any of the studies done by the hydrologists, the people who make models. Supposedly, for more maximum cooling efficiency, the heated water should stay on the surface and not invert. This was due to a salinity difference.

Water pumped through the power plant contains many entrained organisms that may be subjected to thermal shock, physical damage, as well as certain chemical additives.

The types of entrained organisms are various; phytoplankton, zooplankton, shell and finfish larvae are examples. Studies on phytoplankton and zoo plankton have shown destruction of up to 95 per cent upon passage through the S.E.S.

In addition to thermal shock problems, use of chlorine as a biocide to clean condenser tubes may seriously harm entrained organisms.

If recovery rates of entrained species cannot keep up with the destruction rates, extensive depletion of these species can be expected in the open environment.

In addition to effects on entrained organisms, we must also consider organisms in the open environment. Here plants and animals are subjected to the heated discharge water and are influenced by its distribution in the estuary.

After initiation of power plant activity, we observed a considerable increase in green oysters in the river. It is suspected that the greening, which is due to copper uptake, resulted from condenser tube corrosion problems of the plant.

The increase in greening began at stations nearest the outfall and spread with time to down-stream stations.

Fish studies indicate a congregation of fish in the heated water area during cold seasons and an avoidance of the heated area during warm seasons. Filed observations of commercial and recreational fishing support the previous statement.

Large kills of fish and other animals are pertinent to future management or regulatory decisions. Such kills have been reported around intake and outfall structures of power plants.

The largest obeserved in the Patuxent was in 1966, when an estimated 40,000 dead blue crabs were found in and around the S.E.S. discharge canal area.

I would like to add, parenthetically, a recent development that was published in "Science" Magazine, reporting that a very common commercial and recreational food fish, the white perch, has been shown to be a carrier of human pathogens.

For those of you who are Public Health Service people or influence along that line, this raises some interesting problems. We give the fish our stomach pathogens and they can give them back to us.

Also in the study was the notation, whether or not the disease in the fish became epidemic was related to temperature.

Laboratory studies have demonstrated that many estuarine animals found in the Chesapeake region are not able to survive temperature increases much above those maxima that naturally occur in surface waters during hot summer periods.

Some apparently beneficial results have occurred. The sea nettle, considered a pest by swimmers during warm weather, has shown reduced numbers in the estuary near the plant.

Another apparently beneficial result has been the creation of a cold weather fishery for white perch and other species near the effluent.

In the remaining time we would like to offer some recommendations concerning our results. These relate to the Chesapeake area, but may have application in other contexts.

1. Considerably more basic research is needed on the effects of temperature and temperature change on all life history stages of our important aquatic species.

Temperature effects on mortality, behavior and physiological activity are not presently available in sufficient quanity or quality to make definitive predictive statements about S.E.S. effects at all proposed sites.

2. Alternative methods of cooling should be explored and evaluated.

3. Temperature effects must be related to and cross-referenced to other forms of pollution such as organic loading and industrial wastes.

4. Chlorine, used to clean condenser tubes of S.E.S., acts as a biocide, and its use should be prevented. Other less harmful cleaning methods, such as the "ping pong ball technique" should be required.

5. Since certain commercially important shellfish can concentrate heavy metals in their body tissues and be rendered unfit for human consumption, adequate safeguards should be required to prevent metallurgical problems and the consequent release of heavy metals to aquatic systems.

6. If large volumes of cooling water are to be used, site selection is a critical operation and should consider environmental cost benefist, as well as engineering ones.

7. The power utilities should not be permitted to operate independently in site selection and permits for land acquisition, construction and water use should not be given until a responsible state or federal agency has approved the site and operational procedures as optimal to the public welfare.

8. Power utilities should bear the cost of investigational work necessary for site and environmental evaluations.

9. Ecological evaluations must be carried out by responsible individuals or agencies approved by the controlling state or federal agency.

10. S.E.S. regional development should balance with large-scale regional socioeconomic planning and not conflict with it.

11. Possible constructive uses of waste heat should be thoroughly explored, with a pilot plant operation as a first step.

We are attempting to continue our research on thermal effects and have a number of research proposals pending with the State of Maryland and the Office of Water Resources Research.

Proposed research involves a continuation of our laboratory studies, a follow-up study on the effects of thermal loading on primary production of the estuary, and the possibility of undertaking field studies at a proposed coal-fired plant on the Potomac River and a nuclear plant on the bay.

We recognize that our present society cannot maintain itself without an electricity supply, but we also recognize that a quality society needs a quality environment.

With proper consideration by industry, regulatory, management and research agencies, there is no reason to expect less from our technological ability.

As a result of some of the above considerations, Maryland's Department of Water Resources altered its temperature regulations and established relatively stringent new standards in 1967.

Other states are now also establishing temperature standards, some for the first time.

We will hold an international workshop on thermal pollution at our Chesapeake Biological Laboratory in September of this year.

I would like to thank the Federal Water Pollution Control Administration for extending the invitation to our agency and for permitting us to assist the study group in this very difficult task.

MR. THOMAN: Thank you very much.

DR. NICHOLSON: Out of this study, was a maximum-minimum temperature ever established, or do you hope to do this sometime in the future?

MR. McERLEAN: We have established a maximal temperature. I believe it is set at 93 degrees now. I have these data in the material to give to you.

MR. THOMAN: You will submit that for the record, sir?

MR. McERLEAN: Yes. We have seen differentials adjusted to the ecological conditions as being possibly more helpful to the animals.

MR. JENSEN: Yes, I believe that's what the National Technical Advisory Committee suggested.

MR. McERLEAN: Ninety-three, I believe, is the new ruling that the Federal Water Pollution Control Administration has got on it, too. Is that right?

MR. JENSEN: For fresh water.

MR. McERLEAN: For fresh water.

DR. NICHOLSON: Would the temperature of 93 degrees on the Patuxent River apply necessarily to waters such as those in Florida?

MR. McERLEAN: No, sir, not necessarily. You have a completely different problem down here, I feel. In Maryland, we have an interesting situation that for some of our key commercial species, where at the southern distribution of their -- the distribution being a great part determined by temperature.

I would not expect this to be true of Florida. The invertebrate and fish forms living in Florida may be much closer to their maximum temperatures than anything further north.

MR. THOMAN: Vince, would you care to ask any questions?

MR. PATTON: No.

MR. THOMAN: Again, thank you very much for being with us. We certainly appreciate your coming down.

Next, I would like to call Mr. Don Turner, representing Allen Kirkpatrick and Company, Apalachicola, Florida. Mr. Turner.

MR. DON T. TURNER: Thank you, Mr. Thoman. I have been requested to make a statement for the record, giving my opinion to the optimum use and future development of estuarine resources.

I will limit my comments to the estuary I am most familiar with, the Apalachicola Bay area of northwest Florida. The Apalachicola River is formed at Chattahoochee, Florida, by the joining of the Flint and Chattahoochee Rivers.

These two rivers rise in north Georgia and flow south forming the eastern Alabama border. For many hundred years, this watershed has formed an estuarine rich in macro- and micro-organisms which provided the necessary elements and food sources for a wealthy bay, and Apalachicola Bay was a wealthy bay.

Its wealth no longer lives in the deep water port of old, but in the abundance of marine fishes found there.

Long ago, Georgia and Alabama cotton farmers eroded their land by improper farming methods, and this soil flow rapidly filled Apalachicola Bay. It stopped the bay's use as a shipping port but developed the estuary as a commercial fishing gold mine.

In the estuary of the great river, oysters will grow from spat fall to legal length of three inches in just 14 months. In the Chesapeake, three to five years are required. In certain other estuaries of the east and west coast of Florida, the time is reduced to nine months.

An example of the rapid recovery ability of this body of water can be cited. In 1954, a very large commercial oyster bar was completely destroyed by a common disease that follows high salinity curves, dermocystidium.

In 1955, oyster spat reached only thumbnail size. In 1956, the first limited catches were recorded, and in the 1957 season, the bar had fully recovered, by itself, on its own, without help from any poverty program or the like.

Nature, in its finest form, took care of its own solely because no pollution existed to prevent her doing so.

But in recent years, a decline in the production of shrimp in the bay and seed oysters in the shrimp breeding area -- the two are in the same area -- has been noted.

I believe a direct correlation between the lack of baby shrimp in the bay and dog fly eradication programs can be made. The fishermen and shrimpers remember when the dog flies were so bad you could not work the bay without protection.

He caught his year's wages in September and October runs of shrimp and trout and mullet. But he slapped dog flies and smelled of citronella or whatever all day long.

He scratched his bites all the way to the bank. Today the dog flies are so few the fisherman does not have to protect himself while he fishes. In fact, there is not much point in his fishing, and the only reason he goes to the bank is for a loan.

Gentlemen, the widespread use of the chlorinated hydrocarbons in insect sprays to relieve human suffering is creating human suffering in another form by destroying our most valuable resources.

It has been proven that oyster shells sprayed with chloridane to control flies will not catch spat nor produce live oysters when replanted in the bay.

There are many, many bays and bodies of water in Florida that fishing or oystering is not the only source of income for a large per cent of the counties' population, as is Apalachicola Bay.

Others are chiefly recreation, boating, swimming and the like, and as such, related industries return many millions of dollars to the county.

But regardless of the estuarine use of benefit obtained, no person should be permitted to use such God-given grandeur to dispose of his unwanted by-products.

All agencies must work together to bring about an orderly and speedy recovery of sick estuaries and prevent any further deterioration of existing bays and estuaries.

Research must be carried on to determine to what extent residual farm and crop sprays and pest insect spray programs are affecting out natural resource. It is entirely possible for us to create a sterile estuary if we are not careful.

Let us consider the St. Johns for a moment. This is Florida's gateway to the sea. It is a deep-water port, for ocean freighters and tankers. A major naval base is located at Mayport.

This boat traffic is big money to Duval County. But, because of Jacksonville's gigantic pollution of the St. Johns River, together with the boat pollution, oil spills, heavy industry and the like, one cannot harvest a safe shellfish from the estuary.

Believe me, the fattest oysters are those that are sewage-fed. They are also the most deadly.

There is no economic reason any longer to feel that the few oyster and shrimp businesses that could thrive around any county should be sacrificed to gain an industry.

Two counties have enacted enabling local legislation allowing heavy industry to dump raw wastes untreated into the receiving stream.

I have been advised that one county's folly has even affected the sponge industry which operates in six to ten fathoms of water ten miles off-shore.

There is no justification in removing a fishing industry worth half a million dollars to make way for another heavy industry worth a half a billion, when both can survive and use the same estuary.

Gentlemen, I am selfish. I make a good living from the sea and I intend to do all I can to prevent anyone from cutting off my pay check.

MR. THOMAN: Thank you very much, Mr. Turner. Vince.

MR. PATTON: Are you aware that Chapter 67-436 did do away with these local acts?

MR. TURNER: No. I'm glad to hear it, Vince.

MR. PATTON: You're a little behind.

DR. NICHOLSON: You mentioned the dog fly program and blamed part of your problem on it. Would you explain, for the record, what this program is?

MR. TURNER: Yes, sir. I hesitate to say exactly in what year it began, but I would say that within the last five to six years there has been a very decided decline in the fall production of shrimp, trout and mullet in the bay.

At this same period of time, there has been an increase, I guess, in the allocation of money to provide better marine facilities, so that the county programs for doing any eradication could be carried out, in that they were able to get into the real shallow marsh areas in the northeast corner of the bay, which has the heavy shrimp-producing areas.

In the last three years, there has not been enough shrimp caught to even have one's boat painted in the fall. There has been no white shrimp in the bay at all.

MR. JENSEN: Don, I know that oysters are a big business for you. Are there equal opportunities in other parts of the state?

MR. TURNER: Mr. Jensen, if I don't miss my figures too much, about 87 or 88 per cent of the oysters in Florida are produced in Franklin County. The percentage of the other 15 or 16 counties that do produce oysters in Florida is rather limited.

I tend to feel that -- let's say, Brevard County, for example, is better suited for firing rockets to the moon and could get more money and better use of the estuarine waters for this purpose.

But the sole income of Franklin County is either the oysters or St. Joe Paper Company.

MR. THOMAN: Again, thank you, Mr. Turner.

At this time, I would like to introduce the Honorable Gordon Lamont, Mayor of Jupiter Island, Hobe Sound, Florida.

MR. GORDON LAMONT: Mr. Chairman, my name is Gordon Lamont. I am Mayor of the town of Jupiter Island. For you who are not familiar with Florida, I might say that Jupiter Island lies on the east coast, south of Stuart and north of Palm Beach, and it represents an important residential area.

Around it are the towns of Jupiter, Stuart, North Palm Beach and so forth and so on, and the population in that area is increasing rather rapidly, which is presenting some problems which I bring to you today.

Mr. Turner has talked very eloquently on the problems of his estuary, and let me talk to you about ours. I say that the value of the Indian River estuary to the residents of the town of Jupiter Island and the whole area from Palm Beach to Stuart is incalculable.

We fish, we boat, but most important, we live on this beautiful body of water. It is a priceless part of our magnificent environment, and my comments will touch on other nearby areas which should be concerned.

We think, and I present this in terms of not only ourselves, but our neighbors, with all that we have down there, are very definite threats to this Indian River estuary, which is extremely important for the marine life of the Indian River from, again, Palm Beach to Stuart.

There are threats from dredge and fill operations and from pollution Dredge and fill requests will closely follow applications for the purchase of submerged lands.

These applications are now being made, and we look with particular suspicion at the applications for dredge and fill permits at the Palm Beach County land on Jupiter Island.

Upland owners have already been given over a mile of beach front in that area eliminating public access, and now our neighbors, the Palm Beach commissioners and the town of Questa, short-sightedly want to forfeit title to submerged land to State Road 707.

This bay bottom is one of the most significant breeding areas in the Indian River north of the town of Jupiter. How can the trustees even consider this?

There are enough motels and apartment buildings on our upland. How can they, or we, consider selling our priceless estuary for the gain of a few real estate operators?

We violently object and believe that both Palm Beach County and Questa would, in the long run, bitterly regret doing what they propose to do.

The town of Jupiter Island commends the Sanitary Engineering Department, the Florida Board of Health and the newly formed Florida Air and Water Pollution Commission for insisting on ocean outfall as the only solution to preserving the estuaries.

I suggest that the Federal Water Pollution Control Administration immediately fund major research grants to prove the effectiveness of ocean outfalls, investigating primarily the standard of treatment that will be necessary to prevent degredation to our coastal waters.

Obviously, counties and cities north of Palm Beach must find areas to discharge their well-treated sewage, other than the Indian River. The effluents may be pumped into the ocean well short of the Gulf Stream without degrading the ocean waters.

Identical problems exist on the west coast, and we need immediate grants to undertake studies in this direction.

I am pleased to have the opportunity to point out our concern for the future of our estuaries, which are a focal point of view in our lives and an enormous value to wildlife, which, in turn, has a tremendous economic value for the tourists and local residents.

So is is a focal point in the lives of the thousands who live around this area.

In closing, we propose that the trustees of the Internal Improvement Fund at Tallahassee should immediately proceed to dedicate thousands of acres of submerged land per year to the people of Florida, and they are the real owners of these lands.

We ought to see a submerged land bank established now while there is still unspoiled estuary left. There are vast areas of unspoiled estuaries from Jupiter Sound to Melbourne.

Let's urge a program to dedicate these unique and priceless bottoms now and then hold them forever. I thank you.

MR. THOMAN: Thank you very much, Mr. Lamont. After having spent a weekend on your beautiful island, I share your concern. Again, thank you for coming. I appreciate your being here.

I would now like to call on Paul Leach, Director of Pollution Control for the County of Dade.

MR. PAUL LEACH: Gentlemen, I appreciate the opportunity to be here to speak on behalf of the metropolitan Dade County.

Dade County has taken a strong position in relation to pollution. This position has been exhibited and the strong resolve of the elected officials resisting any and all unnecessary fouling of our air, water and land resources through the indiscriminate discharge or deposit of wastes.

Pollution control is simply a problem of waste management. These wastes, for many years, have been thought of as being only chemical or biological.

Dade County is now facing a physical pollution incident for which research is lacking. The electric power utility in our area is now in the process of constructing nuclear generating facilities which proposes to discharge approximately two billion gallons of heated water each day into one of the few unspoiled estuarine zones in the country.

The county government and the state government at this time are unable to supply the man-power or the know-how to research this problem. For lack of a better term, the regulatory agencies are calling this proposed discharge "thermal pollution," whereas, the power utility calls it "thermal enrichment."

I'm going to be placed in the position in two short years of making a recommendation to my elected officials. My recommendations must be based on facts, however, the fact are lacking.

The Clean Water Restoration Act of 1966 called upon you to identify areas in need of further study and the identification of existing and future problems.

I submit to you that one of the greatest unanswered questions is what effect will large quantities of thermal waste have upon waters which already are warm enough to approach the thermal death point in the life in South Biscayne Bay?

The final answer to this question must be at hand quickly if we are to preserve this estuarine zone.

I ask you to consider a study or a transfer of a study in the House on the management of thermal waste to Dade County, so that the answers derived will have an immediate benefit rather than only a possible future use.

Dade County is proud of its record over the past ten years in facing up to the challenge of pollution. It is unfortunate that our record prior to that was not so good.

In the past, however, we have had the benefit of knowledge on which to base our decisions. We are now, however, being forced to guess, and I, for one, am not ready to take the chance of irreparably harming this resource because of ignorance.

I ask you to seriously consider Dade County's request. There may be other problems facing the estuarine zones of Dade County, but I submit, the problem of thermal pollution is primary at this time. Thank you.

MR. THOMAN: Thank you very much, Mr. Leach. Do you have any questions, Gene?

MR. JENSEN: Yes. Just to agree with your observations about this being one of the major problems that we now face in coastal zones, do you have any comments on saline water conversion?

MR. LEACH: No, I have no comments in relation to Dade County. As it appears at this time, we have a sufficient supply of fresh water that would not require conversion of saline water to domestic use.

I would like to comment further on one statement that Dr. Idyll made this morning in which he said there should be no moratorium on the uses proposed in South Biscayne Bay, because we do not have the information.

I am shocked to hear Dr. Idyll say this or make such a statement, especially since he did state that we are ignorant of the facts of this form of pollution in this area.

I would suggest that since, by his own statement, it would be impossible to recover an almost destroyed such estuary, that we must, therefore, protect this one until full information is in.

The representative of the Florida Power and Light Company mentioned that he serves -- their corporation -- serves three million customers, and I would submit, this particular power facility will be capable of supplying a large amount of power, and, regardless of the cost, be it three, six or nine million dollars, to control this on a per-capita basis, this boils down to one, two, three dollars per person, which is, of course, much smaller than looking at it at the total expense of three, six or nine million dollars.

When you look at it at a cost per person, and let's face it, the people are the ones who are paying for this control, paying to have their area protected, it's a small expenditure, I feel.

MR. THOMAN: Dr. Nicholson, do you have any questions?

DR. NICHOLSON: Under the present existing conditions, at what stage in the planning for such an installation as that on Biscayne Bay, do other interested parties get to state their position?

MR. LEACH: At this time, the power plant is in the following position: It has been issued a provisional license from the Atomic Energy Commission to begin construction.

This construction is now in progress. They have made application to the Metropolitan Commission. They have made application to the State of Florida and to the Corps of Engineers to dredge a canal.

My recommendation to my elected officials was that the consideration of this application should be based solely upon, do they, or do they not, want a canal, and not what should be discharged into this canal.

I have stated to the representatives of the Power and Light Company that -- and will continue to do so -- that they will not be permitted to discharge this heated effluent into the South Biscayne Bay without obtaining legal variances and without authority from the Metropolitan Commission.

They have not received this, yet they are continuing with construction. I feel that this might be a rather precipitous action on their part to invest such large amounts of money without having full knowledge that they will be permitted to operate this facility.

MR. THOMAN: I would suspect you would be in rather a poor position if you attempted to shut off their use of this facility for generating electric power after it was, in fact, built.

MR. LEACH: This is quite true. We did discuss this.

MR. THOMAN: This is one reason why I have taken the diametrically opposed position and have recommended to the Corps of Engineers that they not grant the license for that canal.

This is beside the point. The point I would like to get at is at what point in the contruction of the Turkey Point facility was the Metropolitan Dade Commission consulted, or at what point did they grant a permit for dredging into that channel to get water into the condensers, and were you consulted at that point?

MR. LEACH: No, we were not consulted at that time. Possibly that was prior to my coming to Dade County. I'm sure that if a permit was required, I'm sure that the Power Utility did request it, and probably was granted this.

I must plead ignorance of the facts behind this, at this time. I do not know.

MR. THOMAN: This is not meant in a derogatory sense. What I'm trying to point out is that conditions have changed substantially in the last couple of years, when pollution control agencies do get into a review of proposed practices by various types of industries, people who are doing dredging and fill operations and this type of thing.

MR. LEACH: I don't believe -- at least I know locally that we did not even consider the aspect of thermal pollution until approximately two years ago.

At that time, I'm sure that much of the construction was already approved and probably even some foundation already poured. No consideration was given locally to that aspect until approximately two years ago.

MR. THOMAN: Thank you very much, Mr. Leach. We appreciate your being here.

While we had a partial stag party this morning, after Senator Johnson graced us with her presence, a couple of our ladies who were to testify slipped away from here, but at this time, I would like to call on Mrs. Philip Cook, representing the League of Women Voters of Florida. Mrs. Cook.

MRS. PHILIP COOK: I am Mrs. Philip Cook, and I am representing the League of Women Voters of Florida. The League of Women Voters of the United States has been active for many years in the conservation and preservation of our water resources and has been having further accent on antipollution measures since it has become a more urgent matter in the United States Congress.

We were delighted with the action of the Congress in the last two or three years on water pollution research and control.

The League of Women Voters of Florida acts only under the League of Women Voters of the United States, but under that, we are allowed to act locally and our subleagues in the local communities are also doing the same thing.

Our main role is in trying to educate the public and in educating our local officials to take action and to be aware of what is needed and what must be done soon to prevent further pollution and to correct what has already been done.

As so many of the previous speakers have said, estuaries in Florida are in a particularly vulnerable position. The low-lying areas around them make them subject to silting and other drainage.

I feel that the two greatest sources of pollution are the ommission of the raw sewage from improper treatment or from lack of any treatment and the dredging and filling operations of the developers of residential properties.

The two go hand in hand, because when the developers extend these bulkheads and fill in fingers, they also put in septic tanks or rather inadequate and unmonitored sewage plants, and with the low sandy soil and the high water level, the water -- the sewage going into the estuaries is not very well cleared.

The last Legislature of Florida, as you know, passed two good bills for the protection and improvement of our water quality, but the enforcement in many of the local areas is difficult.

Local planning and zoning boards and even the internal improvement trusts of the state are under very great pressure from the builders and developers to allow this dredging and filling of estuaries in the inlets.

But the finger of housing development is stretching out almost to the inlets -- the channels of inland waterways. These, in themselves, constitute danger to the fish and bird breeding areas and inadequate sewage plants further do damage.

I think that any further building should be very carefully screened before permits are issued either by local commissions or by the Internal Improvement Fund.

Our State Pollution Control Commission is always under pressure from some of the industrial plants that do not wish to lay out as much capital at will be needed for the degree of pollution -- this, in spite of the fact that many forward-looking firms in the same field have been pioneers in the antipollution measures.

I think we all agree that sooner or later it's the public that is going to pay for this antipollution anyway, so that whether it comes in the form of tax rebates or wheather it comes in the form of increased prices, it's still we who pay for it.

I think it's going to be well worth paying for. The farther from home, the less, of course, is the local pressure. In that respect, I feel that the Federal Water Pollution Control Administration can be a great help in backing up the state agencies.

Florida is also in great need of funds for implementing a good program for information as to what funds are available. This is particularly true in the local and county commissions who do not always realize what federal funds would be available to them if they made the necessary arrangements themselves.

I believe, again, that the Federal Water Pollution Control Administration can be of great help in acquainting the cities and counties of what is needed and how it can best be financed.

As the questions have come up during the day, I would like to add that many of the county and zoning planning commissions are really only advisory boards, and that when their advice comes to the city or county commissions, it is often very difficult to get their recommendations across.

There are other pressures involved, and sometimes there is also a conflict of interest as to whether the developers or the planning commission wins out, and there, I agree with some of your previous speakers that firm standards from the federal level that must be met would be a very great help in protecting the Florida estuaries.

I wonder if the Mayor of Madeira Beach had with him the book he spoke of, "The Madeira Cocktail." I received one of those, and I think it is quite a hopeful gesture, and I hope that is one of the pieces of material he is submitting to the board.

I think if this innovation process works and proves to be economical, it will be a tremendous asset in our other estuaries also. Thank you very much.

MR. PAUL TRAINA: Thank you, Mrs. Cook. Are there any questions?

MR. JENSEN: Mrs. Cook, you mentioned how the Federal Water Pollution Control Commission backed up the state in some ways in the control of water pollution.

How about on this dredging and filling, do you see any place there that the federal agencies might help out?

MRS. COOK: I don't know, other than in establishing these standards that might also include the amount of filling that was allowed. I don't know exactly how it would be done, but I think that's an awfully important section of our problem.

MR. TRAINA: The League, of course, has been involved in water resources activities for a number of years. There's been some discussion this morning about zoning and setting aside -- what role do you see for groups such as the League in the community?

MRS. COOK: Our role is mostly public relations in a case like this, trying to work with the public to make them aware. I think, fortunately, not only the League, but the news media and all the other things are finally making the public aware of the desperate need for correction of mistakes, but we also work, of course, directly with the county commissioners or other government agencies to try to make them meet standards and take action.

MR. TRAINA: Thank you, Mrs. Cook.

I would next like to call on Mr. William R. Neblett, representing the National Shrimp Congress.

MR. WILLIAM R. NEBLETT: My name is William R. Neblett, and I am here as a member of the National Shrimp Congress, a national trade association with headquarters in Key West, Florida, of which I am the Executive Director.

This presentation is concerned in and endorsed by the Florida Shrimp Association, with headquarters in Tampa, Florida.

The entire shrimp industry is directly and vitally concerned with the problems of estuarine pollution. Estuaries are the life and death of shrimp, as I will detail later.

I will confine my self primarily to the estuarine conditions in Florida, and particularly in the Tortugas area. However, the same general principles apply in the Louisiana bayous, in Galveston Bay and Brownsville, Texas, and wherever we find shrimp.

In preserving the shrimp fishery, we are not speaking of pennies. Shrimp is the Number 1 United States fishery in dollar value, and the first one in history to pass the 100-million-dollar mark.

One hundred million dollars was the amount paid dockside to the boats and crews in 1967 for the shrimp harvested by U. S. vessels domestically, and over 90 per cent of this bonanza came from the Gulf of Mexico.

My own county of Monroe leads the State of Florida in value of fisheries. With us, it is the third-largest industry, accounting for more than six million dollars per year in our economy.

There are perhaps 6,000 vessels and boats fishing for shrimp. Of these, there are about 1,500 vessles of 50 to 90 gross tons employed exclusively in the catching of shrimp.

A new shrimp trawler in this category costs from $60,000 up to build and equip, so that the investment in trawlers is considerable.

There is a further heavy investment in dockside facilities, and, fater the harvesting, there is further investment in refrigerated transport, cold-storage and processing facilities and related industries which runs into the millions of dollars.

When we speak of the catch of shrimp from the Tortugas grounds, we include Sanibel Island, because the same variety of commercial pink shrimp is found there.

The Bureau of Commercial Fisheries, Department of the Interior, has furnished statistics of this catch from the year 1956 through 1967, which is here reproduced as Exhibit A.

This fishery was first discovered in the winter of 1949-1950, when a commercial exploratory trawler, after disappointing daytime runs, put its nets over at night.

Since that time, commercial fishermen have taken from these grounds a total of more than 200 million pounds of pink shrimp, with a value to the boats and fishermen of more than 100 million dollars.

See Exhbiti B for description of the Tortugas-Sanibel shrimp fishery. This is an annual crop which can edure forever. We need not plow, nor seed, nor fertilize.

We need only to preserve and protect the natural environment which makes this sea crop possible. Without the proper estuarine conditions, this stock of shrimp would disappear, because the estuary is a vital link in the life cycle of the shrimp.

The following comments regarding the life cycle of shrimp in the Tortugas area are quoted almost verbatim from remarks of Dr. Clarence P. Idyll, Institute of Marine Sciences, University of Miami.

Dr. Idyll is an authority on this subject, and we have drawn upon his knowledge freely, with his consent.

Spawning of the pink shrimp occurs in the Tortugas grounds, offshore and generally north of the Florida Keys between Key West and the Dry Tortugas.

The fertilized eggs are cast free in the water, hatching in about half a day to a tiny larva. In the space of about three weeks, the shrimp pass through some 11 larval stages, during which time, millions of them have travelled from the Tortugas grounds to the mainlands of Florida -- the estuaries.

In this case, the estuaries are primarily within the Everglades National Park. For about half a year, they live in the estuaries, where large quantities of fresh water exclude marine enemies, and where warm temperatures and rich supplies of food favor their growth and survival.

Then the migrating urge hits them, and in great numbers, they reverse their route and head to sea once more, to spawn and to be caught by the commercial fishery.

The ancients thought that the natural resources of the sea were inexhaustible. Modern science knows better. In our own life we have seen the destruction of certain stocks of fish or their displacement by other types of marine life.

Yet, despite the many other factors which might reduce this stock of Tortugas shrimp, such as natural predators, overfishing, et cetera, the one factor which could certainly destroy it would be such a change in estuarine conditions that the shrimp would lack a proper nursery.

There cannot be a large pink shrimp population large enough to support a commercial fishery without a brackish estuary as is found in the Everglades National Park.

Thank God for the government and the Everglades National Park.

Dr. Idyll emphasizes that it is clear that there cannot be a large pink shrimp population, large enough to support a commerical fishery, without a brackish estuary, as is found in the Everglades National Park.

Reduced salinity is vital to the young shrimp. The estuary provides two important factors: protection from predators and abundance of food.

The kinds of fishes most abundant in the estuary, unlike their cousins in the salty sea, are those kinds which, generally speaking, do not eat shrimp. The natural animal and vegetable life found only in estuaries provides the proper food for the young shrimp who like to burrow in the mud.

From a fisheries standpoint, scientists say that some of the regions where fresh and salt water mix are often 1,000 times as productive of life as either fresh water or sea water.

Even the origin of life is said to come from some bracksih lagoon where land and water adjoin. A writer of fiction might, on the other hand, characterize these swampy areas as fever-ridden and mosquito-breeding.

Men have always loved to dwell and have their businesses at the water's edge. The major cities of the world have been sea or river ports for the sake of commerce.

Florida today is the mecca for lush subtropical living and its phenomenal growth continues apace to require the setting aside of more and more land for residences.

Waterfront lots cost double the price of lots just one block inland, and the land developer's equipment is busy dredging and filling so more and more homes or apartments may face on canals.

To facilitate waterborn commerce and pleasure craft, sometimes access canals have been cut without regard to the effect on the ecology of fish and wildlife.

There are other and many competing uses for estuaries, which, if not watched carefully, will cause the end of many species of wildlife.

Actually, estuaries comprise a very small part of the United States, less than one per cent. However, half of this estuarine area is found in the five states that border the Gulf of Mexico.

According to Seton Thompson, Regional Director of the Bureau of Commercial Fisheries, St. Petersburg, Florida, in the Gulf of Mexico, 90 per cent of the commercial catch is made up of fish and shellfish that spend some time of their lives in estuaries.

And incidentally, the Gulf of Mexico produces some 27 to 28 per cent in dollar volume of all the commercial fisheries of the United States. It's a very rich area.

A recent survey disclosed that at least four per cent of the Gulf estuarine areas have been totally removed from a biologically productive status.

The Central and South Florida Flood Control District was created many years ago as a notable and excellent vehicle for draining parts of the Everglades, controlling floods, and making available new, rich farmland which has proven highly productive.

Also, to keep some of our excellent tourist facilities on the southeast coast, more familiarly known as the "Gold Coast," from washing out to sea, several water conservation areas were created and dikes and dams were built to control the flow of this water.

To relieve the pressures on Lake Okeechobee, when the Army Engineers felt that water levels were so high as to be dangerous, particularly in hurricane years, only two fresh-water escapes have been available -- one to the Gulf via the Caloosahatchee River, and the other to the Atlantic via the St. Lucie Canal.

Much valuable fresh water has been diverted down these avenues at critical times, without any benefit to the seacoast at either outlet, rather, to the contrary.

Yet, there are times when the precious marine and animal life in the Evergaldes National Park has suffered from a lack of water, with damaging results of causing smaller estuarine areas and higher salinity.

Even the unscientific fishermen who man the shrimp trawlers speak knowingly of the wet years and the dry years and know that there is a relation between the proper maintenance of the estuary which is the shrimp nursery ground and their livelihood, which is the capture of the adult shrimp.

When central and south Florida was a "sea of grass" made by nature, there were still some dry years when the estuaries suffered from an abnormally low input of fresh water, but since man has "improved" the area to the north of the Everglades, he has correspondingly failed to consider the necessity of the estuary for fresh water.

Yet, with the fresh-water reserves available, it is now really possible, for the first time, to nourish this outstanding estuarine area in a controlled and intelligent manner, and the prime recommendation of this paper is that such controls be instituted.

We need rich mucklands for vegetables and sugar cane; we also need wetlands for shrimp and other marine life. We need wetlands for the conservation of certain species of animal life that live nowhere else in this country.

In speaking of industrial improvements that are going to be necessary to the expanding population, I don't think we have still paid enough attention to the food requirements of the future.

We are using, at the present time, less than 25 per cent of the available food resources of the sea.

The world population increases at such a rate that a food shortage is predicted within a short span of years. Thus, the untapped resources of the sea may be likened to a bank in which we keep our savings against a rainy day.

As an adviser to the Department of State on Fisheries and Oceanography, I am constantly aware of the efforts being made on a national and international level to resolve many thorny fishery problems which arise from legal concepts of jurisdiction over areas of the sea.

Fisheries have become so important that brand-new terms of reference have been contrived. In addition to the territorial sea, we now recognize a contiguous zone exclusively for fisheries.

In 1966, both the United States and Mexico established such zones to a 12-mile limit and have since entered into solemn agreements concerning rights to fish in the new zones.

Vast Soviet fishing fleets have appeared in the northeast Atlantic and off Alaska, and national thinking about fisheries has been stimulated by such activity.

Biologically, more than 90 per cent of the world's fishery stocks are found over the Continental Shelf. Again, the major portion of these important fishery stocks use estuaries as part of their natural lives.

Most fish, it seems, have a link with the land at its confluence with water.

We do not dwell here on the well-knows adverse effect which river pollution brings to fish stocks at the river's mouth, nor on the poisoning by insecticides, or other evils.

We only emphasize the association of the valuable food available in the ocean with the proper care, maintenance and management of estuaries.

There is a school of thinking that believes that mankind is busily seeking self-destruction. This philosophical group may be proved to be right if we do not forthwith take adequate and positive measures to protect the one area in the life cycle of food fish which we can protect because we do have jurisdiction over estuaries.

We may be helpless under current international law to stop fish slaughter 13 miles off of our coasts, but even here, under the 1958 Geneva Convention on Fisheries, we are able to take some action, and

I foresee continuing activity in the conservation field in the world community to preserve fishery resources.

While the slow process of international negotiation is taking place, let us move more rapidly to preserve our natural estuaries. As our people learn the true significance of this food problem, they will give their support to the legislators, who, in turn, can give us proper laws for the protection of estuaries and necessary funds for their management and preservation. Thank you.

MR. THOMAN: Thank you very much for a fine statement. Are there any questions?

MR. JENSEN: I have two questions. The first relates to this matter of values. You mentioned only -- on the one hand -- that something like 200 million pounds, with a value of about 100 million dollars, which is around 50 cents a pound.

I think that you also mentioned something else, that the fishing industry, the shrimp industry, supported, in turn, a long series of refrigeration facilities -- truckers -- that many people make their living out of it.

Do you have any further thoughts about how we might get a better representation of the true economic worth of the fishing industry?

MR. NEBLETT: I think, to be perfectly honest, that, naturally speaking, the fishing industry, as compared to other areas of making money, is a very, very small industry, and our favorite Congressman in Washington tells us that they way we get things done is to scream louder, because in terms of return on investment, if you were making a return, you might do very well in the fishing business, but in terms of the national economy, as I recall the figures, it's a very small percentage, the fishing industry is.

What I'm trying to accentuate is, we all have to eat, and if the prediction is on increasing population and the diminishing of availability of food, whether it be land or seafood, that is faced with this, then we are not doing the proper long-range planning, unless we, at the same time, protect our future supply of food -- unless the chemists can come up with some kind of synthetic food which we know nothing about yet.

MR. THOMAN: Thank you very much, again. At this particular time, I would like to call on the Honorable Cliff Reuter of the Florida Senate, from Sharpes, Florida.

SENATOR CLIFF REUTER: Thank you very kindly. I represent Brevard County, and our estuaries, which include the Indian and Banana Rivers, inlets and harbors -- our most valuable local natural resources.

The extensive salt-water flats are the natural breeding, spawning and feeding grounds for great numbers of fish, crabs and shrimp. These, in turn, support a multimillion-dollar commercial fishing industry.

The oysters harvested from our water are second to none in quality and growth rate. The area supports an even larger tourist paradise, and, most important of all, is the recreation afforded to local residents in the form of sport fishing, boating, water skiing, et cetera.

The problem of pollution control of our local estuarine resources, as I see it, is a function of the mushrooming population growth.

We pour pollution into our water resources and compound the destruction with frantic dredge and fill operations.

An example of this dredge and fill is Lake Worth in Palm Beach County, where the grassy flats have been almost completely destroyed. There the sea trout catch in five years dropped from 336,936 pounds to 1,557.

The oyster, which concentrates pollution, can be viewed as an early warning indicator of the extend of pollution. The taking of oysters has now been restricted to certain areas in south Brevard, while the rest of the river has been downgraded. Even there, some of the areas are only conditionally approved -- a touch-and-go situation.

Some of the results of this population growth are:

1. Pouring off pollutants, such as sewage effluent, storm sewer run-off and agricultural irrigation water into our streams, bays and rivers.

2. Dredge and fill operations, in which the area pumped out for fill becomes an ecological desert along with the loss of the area filled -- a double disaster.

3. The creation of narrow canals which lack circulation and become stagnant and polluted.

4. All of this, combining to ruin the feeding and spawning areas, kill the fish, and, in time, reduce our greatest natural resource to a liability.

I feel fortunate in being able, during the past year, to take a leadership position in the following actions aimed at overcoming the problem.

Statewide action was taken in the passage of a Pollution Control Act which provides the mechanics and the penalties to enforce responsible pollution control.

In addition, a much tougher new dredge and fill law was enacted to give new tools with which to clamp down.

Locally, in unison with the Brevard County Commission and with the effective support of the rest of the legislative delegation, very far-sighted laws were passed which provide:

1. Statutory septic tank regulations.

2. A Water and Sewer Act, which gives the county authority to plan and work effectively in these areas.

3. A permissive solid waste disposal plan which would be activated in cooperation with the municipalities.

4. An oyster deupration (cleaning) plant to be planned, built and operated through the cooperative effort of the boards of health and conservation and local oyster interests.

5. A shellfish management act to promote the shellfish industry both commercially and for recreation.

Now, all hands must move immediately and swiftly to solve these problems. First, the state should continue with the implementation of the pollution control law and the dredge and fill law.

Concurrent with this must be a continuing, careful analysis to insure that they are doing the job required. Corrective amendments, if needed, must be prepared and ready for speedy passage at the next regular session of the Legislature.

Second, the county and local units should continue with implementation of local laws keeping a careful eye out for any corrective amendments at the next session.

Third, the county commission should call for an immediate moritorium on all dredge and fill permits.

Fourth, the legislative delegation should work towards enactment at the next regular session of local bills which would effectively and permanently halt all dredge and fill operations.

And fifth, I look to the federal government to provide the coordination, advice and overall standards which will enable all levels of government to work cooperatively in solving this problem of pollution. Thank you very much.

MR. THOMAN: Thank you very much, Senator.

SENATOR REUTER: I have a report here from Phil Searcy who represents the Brevard County Health Department, and he wishes that it be made a part of the record.

MR. THOMAN: Thank you very much, Senator. Would you like to submit Mr. Searcy's statement for the record?

Gentlemen, do you have any questions?

MR. PATTON: Yes, I have a question.

MR. THOMAN: Vincent.

MR. PATTON: I recommend moving to take action to remove some of the pollution that in previous years had gone into the Indian River, Indian Waterway, but what about counties where the local officials seem to want to continue not taking any action?

SENATOR REUTER: I represent four counties down the coast: Indian River, St. Lucie and Martin Counties. Actually, this would be my first term, and being from Brevard County, I think that local laws we did pass, I feel were a real good start, and I would like to see us do the same in these other counties.

I think that if we use this series of acts that we did pass and go into these other counties and review them and see if we couldn't do the same with these areas, I think it would be good.

I think these are laws which could very well be used throughout the state as a way to approach these problems.

MR. PATTON: Thank you.

MR. JENSEN: Do you have thoughts on statewide, or countrywide, or major estuarine zoning?

SENATOR REUTER: As I said in my statement, I think that each individual fill and dredge operation might be good on the face of it, but I think we have got to draw a line, and the only place I can see to draw a line is to have no more filling and dredging.

I think we are just losing our greatest natural resource.

MR. JENSEN: Thank you.

MR. THOMAN: For the record, we will note that statements will be submitted by Fred Funnell, President of the Water and Pollution Control Operators Association; Mrs. Allan D. Cruickshank, Indian River Audubon Society; Mr. William F. O'Neill, President of the Tampa Bay Engineering Company, and I believe he is representing the Committee of 100; and Mr. James E. Mooney, Director, Metropolitan Affairs Department, Jacksonville Area Chamber of Commerce.

At this time, I would like to call on Mr. John W. Bonsey, Chairman of the Board of County Commissioners at Pinellas County, Clearwater, Florida. Mr. Bonsey.

MR. JOHN W. BONSEY: Thank you, Mr. Chairman. Ladies and gentlemen, it is a great pleasure for me to be able to meet with you today and to provide you with a few comments from Pinellas County regarding this highly important matter of estuarine pollution.

We, in Pinellas County, are perhaps more concerned with it than many areas, for, taken in the broadest sense of the term, Pinellas County is surrounded on three sides by large estuaries.

To the east and south of the county lies Tampa Bay, itself a major estuary on the west coast of Florida.

On the western side of the county, the shoreline borders on a series of bays cut off from the Gulf of Mexico by a long chain of keys.

As in other areas, Pinellas County relies heavily upon the attributes of a favorable climate and the ready availability of large bodies of water. The tourism, retirement living and industrial growth of Pinellas County is dependent to a large extent on these natural benefits.

It is upon these things that we must rely to enjoy continuous health, expansion and growth -- both in population and in economic matters.

Foremost among these attributes is, of course, the waters which surround Pinellas County, for it is these waters that provide the swimming, fishing and the boating which draw so many people to our area each year.

Yet, we find ourselves with a paradoxical situation, for as Pinellas County and the surrounding areas grow, the problems with the pollution of our bays and estuaries become more acute.

The Board of County Commissioners and the various municipal governments of Pinellas County have, for many years, recognized the growing problem of pollution.

Steps have consistently been taken to control and prevent further pollution of our estuaries. The Board of County Commissioners, within the limits of its authority, exercises control over dredge and fill operations, for we recognize that uncontrolled operations of this kind can lead to the rapid depletion and even total destruction of breeding grounds for sea life.

Further efforts to control pollution have been made by the board which are equally significant. At the present time, Pinellas County has over 90 per cent of its population served by sanitary sewers.

This, in itself, has provided a strong controlling factor on the pollution of the bays and estuaries which surround our county.

The board is exercising continuous scrutiny of the problems related to providing sanitary sewer facilities, and is continuously in the process of improving, updating and expanding our sewer systems to meet the needs of a rapidly growing population.

The municipalities of Pinellas County have also played a significant role in this area. Also, stringent controls have been enforced and continue to be enforced upon the usage of septic tanks and other devices which in any way might tend to aggravate or increase the pollution of the estuaries and bays around our county.

Gentlemen, we, therefore, feel that Pinellas County is making a great effort to exercise control over the problems of estuarine pollution, which so vitally affects our very livelihood.

However, the problem is one that estends well beyond Pinellas County. There is no way that we in Pinellas County can exercise complete control over the pollution of our bays.

We can control the amount of pollution that we contribute as a county; but the waters of the estuaries which embrace Pinellas County receive the outfall and possible harmful pollutanta from the entire surrounding area.

For this reason, if the pollution of the estuaries in our immediate vicinity is to be effectively controlled, the controls must be exercised on a regional basis.

The local efforts to control the problem are of an immediate concern to us, and it is our belief that we have actively pursued this.

However, the effectiveness of our work must be matched by effective methods of control exercised in adjacent counties and, indeed, the surrounding areas of the central portion of Florida.

We are fortunate in this region of Florida's west coast to have a regional planning council which has been recognized by various federal agencies as a competent review agency for many federal programs.

It seems reasonable to believe that this regional organization can play a significant role in the coordination of the control of estuarine pollution. However, the scope of the problem extends beyond just the regional agency's sphere of interest.

The problem is one, therefore, which must be tackled by a concerted team effort that includes the local governments, the regional organizations, the state, and finally, the federal government.

Pollution does not recognize the artificial boundaries of state lines nor of county or municipal lines. This simple fact requires that every effort must be made to establish a strong, coordinated effort on the part of local, regional, state and federal agencies which are concerned with this growing problem.

It is our sincere belief that these efforts muct be undertaken immediately for the problem exists now.

In conclusion, gentlemen, I would like to emphasize those that I feel to be some of the points of paramount concern in this problem area.

These are:

1. Local government jurisdictions must provide the efforts to control their own pollution.

2. This can only be done effectively on a regional basis, if it is coordinated.

3. A regional program will only be effective provided it is coordinated with the other regions of the state.

4. The state must also coordinate its efforts with the federal government and the surrounding neighbor states.

I would emphasize that by coordinated efforts, I do not mean that this problem should be directed and controlled by the federal or the state government.

It is up to the local jurisdictions to resolve the problems. However, it is mandatory that the solutions which local governments implement to forestall further pollution of our nation's estuaries be done in a manner which is compatible with the efforts being made in neighboring areas and in neighboring states.

It is a monumental task which lies before many of us to successfully combat these problems. There will be need for assistance financially from state and federal sources to supplement the already overburdening financial problems confronting local jurisdictions.

However, the local jurisdiction is in the faborable position to proceed with the resolution of the problems; and we would hope that the results of this Naional Estuarine Pollution Study will establish necessary and suitable guidelines and set up a frame of reference within which all areas may work collectively towards the resolution of this major problem.

Thank you, gentlemen.

MR. THOMAN: Thank you very much.

Mr. Reed, officially we wish to welcome you. Apparently his plane wouldn't get off the ground this morning.

THE HONORABLE NATHANIEL REED: More importantly, Commissioner Thoman, it landed. (Laughter)

I enjoyed your presentation, sir. I thank you all for coming and attending this meeting. I apologize for being so late. I trust the agenda this morning was filled with interesting items concerning our estuaries.

I understand that the meetings have been very fruitful and filled with interesting presentations, such as the last one. I look forward to hearing some more. Thank you, and again, my apologies for being so late.

MR. THOMAN: Does anyone have any questions to direct to Mr. Bonsey? Well, again, thank you, Mr. Bonsey.

I would like to call Mr. Richard Jones, who is representing Mr. John C. Lee, Associated Industries of Florida.

MR. RICHARD W. JONES: Mr. Thoman, panel members, Mr. Reed, ladies and gentlemen: My name is Richard Jones of Associated Industries of Florida. I'm representing our Executive Vice-President, Mr. John C. Lee, who is unable to be with us today, having another sepcial meeting in Tallahassee.

Our organization represents the widest possible cross section of business interests with respect to size, geographical location and business endeavor.

We, therefore, have a profound interest in the optimum use and future development of estuarine resources.

Generally speaking, Florida has a much higher quality of water in most of its rivers, streams, lakes and bays than exists in most other states, but we realized there were areas in which improvement is required.

As a result of encouragement by the business community, former Governor Haydon Burns appointed the Governor's Advisory Committee on Water Quality Control, which held public hearings throughout the state and designed the basic standards now under consideration by the Secretary of Interior for control of water quality in our state.

This Advisory Committee was composed of appropriate state, county and municipal personnel, the general public and scientific personnel from industry.

The task of this latter segment of the committee was indeed difficult, for while they were trying desperately to design for Floirda standards of the highest quality, thus preserving Florida's ability to police its own waters, they labored under the realization that they were imposing upon their employers the most severs and sudden financial burden ever required by force of law.

When their deliberations were completed, we had a new Governor. The business community met with Governor Kirk and encouraged him to initiate the second phase of the overall approach initially suggested to

Governor Burns -- the appointment of a committee to recommend classification of streams as required by the federal law.

The business community worked with several committees of the Legislature to draft and pass legislation to enable Florida to maintain its independent status by establishing the Florida Air and Water Pollution Control Commission.

This Commission, coupled with the strong coalition of industry and our state government working together to solve the problems of pollution, can lead the nation in water quality control.

In fact, Florida's action is fast becoming a model for other states. Certainly, our job is not complete; it is just beginning.

Proper performance by the Florida Commission would dictate that it maintain continuing studies of our estuaries and all waters to assure that improvement is taking place, that technical devices approved for use are properly functioning and to assist in future long-range planning.

Naturally, this will require the cooperation of all interested parties within the state, and, indeed, the federal government.

We predict the Florida Legislature will not be niggardly in its appropriation for this Commission, and that within the spirit of the Federal Water Quality Act, Florida will be able to provide for its own needs and fulfill its oblications.

We further feel that the profit to be gained from such public hearings as this one today and tomorrow will be appreicated by the federal authorities that the state governments and business and industry are working together and are dedicated to the fullest proper use of our waters in their recognized classifications ranging from human consumption to industrial use under controls which are realistic and practical. Thank you, gentlemen.

MR. TRAINA: Thank you, Mr. Jones. Are there any questions from the panel?

MR. JENSEN: I don't have any.

MR. TRAINA: Thank you. Next on our list is Dr. Dean F. Martin, University of South Florida. I believe Dr. Martin is representing the American Chemical Society, is that correct?

DR. DEAN F. MARTIN: Actually, I am representing the Florida Section of the American Chemical Society, composed of Florida members of the 100,000-member American Chemical Society.

These members are professionally trained and professionally oriented chemists whose experience and interests cover a wide range. Many are educators, many are consultants, many are industrial chemists, and some are retired.

As a group, they represent an interested and an informed body of citizens who are much concerned about not only the socioeconomic problems and consequences of estuarine pollution, but the chemical and biological aspects, as well.

They are well aware of the impact that estuarine pollution has on the average citizen, and they know that approximately 30 per cent of the U. S. citizens live within 50 miles of our coastline, which includes all of the estuarine zones.

They are even more aware of the greater consequences that the estuarine pollution has for Florida citizens because of the greater proximity of these citizens to the coastline.

The members of the Florida Section recognize the need for an enlightened partnership between governmental bodies, industry and scientists in combatting estuarine pollution.

I suggest the Florida Section represents a useful pool of talent, knowledge and experience that is available for making a contribution to this partnership.

I suggest that members of the Florida Section could make an important contribution in the areas of basic and applied research on effects of estuarine pollution.

This research needs to be done in two areas that seem to have been neglected in estuarine pollution studies.

The first of these, I think, is Question Number 1: What are the long-range effects of given pollution levels? I think a chemist can determine with some degree of confidence the toxic level for a given contaminate, for a given organism, under a specified set of conditions.

But typically, very little information is available on the long-range effect of sublethal levels of this particular contaminant.

We have seen perhaps one or two examples of this mentioned today. The first example, as I recall it, was the effect of sublethal amounts of copper, the amount of copper that is tolerable in drinking water will cause oysters to turn green, which is certainly an appropriate thing for St. Patrick's Day, but certainly inappropriate for consumption.

The second point was raised earlier this morning, the so-called effects of DDT. No one would disagree with Mr. Davis that DDT has its beneficial uses to mankind, but, I think, few of us would deny that long-range effects of DDT are detrimentally incalculable, but certainly very, very deadly.

Very recently, in "Science" Magazine, two scientists, Wurster and Wingate, reported the results of a study on the Bermuda Petrel. The Bermuda Petrel may not seem like an interesting bird, but I think it has some implications for us in terms of the effects of DDT on estuarine pollution.

In 1960, and actually, 1945, the Bermuda Petrel was the predominant bird in Bermuda. Recently, it has appeared that DDT residues in eggs and in chicks of this particular bird are increasing, and it appears that this organism -- or this bird, rather -- will shortly pass out of existence.

It is predicted by 1978. In other words, from '45 to 1978, it is on its deathbed. The interesting thing, it seems to me, about this particular bird is the fact that it does not get its DDT from Bermuda.

It does not accumulate DDT in the shell or in the chick in Bermuda, but rather it picks this up as part of a long-range oceanic chain, food chain, and it appears to us that our entire ocean, therefore, is contaminated with DDT.

And you can trace this food chain from the large predators to the smaller predators down to the small plankton plant, even to vital plankton, so our entire food chain, perhaps, is contaminated with DDT.

We would ask, "What next?"

The next question I would ask is what are the effects of depletion that seem to accompany pollution? This seems to be to be something that has not been empahsized here except in perhaps a cursory way.

One ecologist this morning suggested he did not know the long-range effect of thermal pollution. As a chemist, I know one obvious effect. This is an application effect.

With thermal pollution, the oxygen levels are depleted, and this has consequences on the depletion of the kind of fish and the numbers of fish that can exist under certain specified conditions.

Mr. Jensen, I think you raised a point this afternoon about desalination. It seems to me this is another form of pollution, rather depletion accompanying pollution.

It seems a little odd, but after all, one must recognize that you will be depleting the water supply when you sesalinate, but not only that, you're left with this partly large residue that you must do something with.

The obvious thing to do is throw it back roughly where you get it, and very frequently, this will be near an estuary. These will exist, and they will come in larger and larger numbers, and we must be faced with this possibility with what to do with this large amount of dissolved solid or what to do with this large amount of material that accompanies the depletion.

And the third point, or need, I would say, in connection with the estuarine pollution, is what to do with all these data, what to do with all this information we shall acquire, if all these suggestions are followed.

In other words, we are going to be faced with perhaps a monumental data-retrieval problem. This is the third and perhaps the most significant of our three areas.

What good would it do to spend all this money on basic research, which we would certainly advocate, if we could not get the data back.

In this connection, the American Chemical Society has been ever concerned. This year, they have issued a new journal called "Environmental Science," which is broadly oriented and which, I am sure, most of you are familiar with.

Also, they have had for many years chemical abstracts, and they cover many of the data. Unfortunately, not all of them are becoming available to us.

So I would say that we have these three areas of concern: One, what are the pollutants; two, what are the effects of depletion accompanying pollution; and three, how are we going to retrieve the data once we have acquired them to make them useful to ourselves?

I have suggested some ways. I would suggest that the most important thing I could say to you, gentlemen, is that the Florida Section of the American Chemical Society offers their talents and their experience to you and to those who are interested in problems of pollution, and I would say that would take care of all the persons in Florida. Thank you.

MR. TRAINA: Thank you for that very fine statement.

MR. JENSEN: I asked someone this morning about their views on the need for establishing a separate or special information service for the estuarine sciences.

Would you care to comment on the desirability of that?

DR. MARTIN: I should like to think that this could be done. I would like to hope that it could be done within the framework of the American Chemical Society, or within the framework of biological abstracts, for example.

If it turns out this is not feasible, and one must recognize that the chemical abstracts' service goes into the red more and more each year, then regrettably, it could not be done, and a special service would have to be set up.

I would hope that the duplication, which would inevitably result, however, could be avoided.

MR. TRAINA: Dr. Martin, I would like to ask you one question. You talk about the sublethal effects of some of these toxics. Do you think estuaries, by their nature, aggravate or emphasize this situation?

DR. MARTIN: It depends upon the estuary, surely. In some of these, in which the circulation is poor, this certainly must be the case. Many organisms we would recognize have the facility of concentrating certain metals.

I think that Nicholas has found if you find any organism is able to concentrate some metal very, very selectively, and this could be a very serious problem -- oysters, in particular, that I would suggest that one of the problems of thermal pollution is that the materials that are alluded -- a gentlemen referred to earlier -- that this could serve as a sublethal dose, not necessarily to the blue crabs, but to the man that might eat them.

MR. TRAINA: Thank you, again, Dr. Martin.

DR. MARTIN: Thank you.

MR. TRAINA: Mr. Bair, I have your name, but I don't have your affiliation.

MR. ROBERT T. BAIR: I was asked by the President of our Federation to extend their greetings to you, Mr. Reed, and to this fine crowd assembled here, and to say that we are so much in sympathy, after a sort of metamorphosis that has gone over our group.

We have been, until recently, a fishing and hunting club, somewhat pretty professional. We are now standing, as you have learned from some of our work done, as a fine conservation-minded organization with outposts throughout the state, who are manned by strong-backed and willing workers, who would always volunteer to help in any situation that they might.

I would illustrate a group from St. Petersburg known as the Causeway Isle and Yacht Club Estates Civic Association, who, with four professional members, a lawyer, two doctors and an engineer, prepared one of the most beautiful presentations for non-dredging and filling demands that I have ever read.

That, of course, is one of our goals. They have asked me to present this for your files. I think that one of the things that has been the personal observation of some who will follow me from my former County of Martin is to know that there is a tremendous pollutant present in estuaries where there is an over-supply of fresh water.

Clean though it may be, almost wholly clean except for some siltation that it deposits coming from the reservoir that is supposed to conserve our water.

When we don't conserve our waters, when we extend these waters out to sea where they do absolutely no good and where they rather injure the ecology of the estuary through which they pass, when they go through that estuary moving at the rate of 20,000 cubic feet per second, that's something like 18 billions, I believe, of gallons of water a day.

They certainly interfere with the crustacean life, the shell life, who will die in nine hours of such a discharge.

Of course, the commercial and sports interests, then, find no fish in their estuary for a period that may run to two years from a single discharge which will last for only three or four weeks.

The feature of overpopulation, of the salinity content, so that it is down to five parts per thousand is one of the things we have learned in Martin County that has been most dramatic.

The oil spills have been covered in Palm Beach County. They are being looked at, I am sure. We have gone out to the Bahamas with some of our help. Those things are going to be zoned, I think, by scientists, and as a friend of the lab, as Bob Ingle once called me, I want to extend every help and every aid that we may to the members of the sciences who are studying the estuaries.

Thank you very much. I will leave this with the reporter.

MR. REED: Thank you, sir. It's nice to see you.

MR. TRAINA: The next person on my list is Mr. William Partington of the Florida Audubon Society.

MR. WILLIAM PARTINGTON: I actually have two statements here. One of them has been prepared by the Florida Audubon Society, and the other one is from one of our chapters, The Pelican Island Society.

I wish to read them both. The first one is from The Pelican Island Society of Vero Beach, Florida. It reads as follows:

> "The Pelican Island Audubon Society of Vero Beach, Florida, wishes to present this letter for consideration at the water pollution hearing to be held in Orlando, Florida, on March 12 and 13, 1968.
>
> "Our membership comprises residents of Indian River County, and we feel very fortunate in that we live in a beautiful section of the Indian River and that we have a cooperative and understanding Board of County Commissioners who are alert to the dangers of unrestrained development as it relates to the pollution problems in the natural areas of this river.
>
> "The valuable fish breeding grounds in the Indian River, extending from the Sebastian Inlet south to the Wabasso Bridge, have, in

the past, been threatened by proposed developments that would have extended bulkhead lines several hundreds of feet.

"We firmly believe that all bulkhead lines should not extend beyond mean high water. Where navigation and access channels are created, the work should be accomplished only by the use of retention dikes and suitable weirs that will stop the flow of fine materials with the consequent destruction by sterilization of large areas of valuable bottom lands.

"In fact, the bird life in the enlarged Pelican Island Federal Wildlife Santuary is entirely dependent on the food supply provided by this natural section of the Indian River.

"Another factor with which we are concerned is the expanding use of causeways, instead of pilings and bridges.

"Where there is a natural current and tidal ebb and flow, it appears to us highly desirable to allow a free unhindered action of the stream.

"This will keep the pollution problems to a minimum and allow a self-cleansing by natural means.

"Living in an agricultural community, we are conversant with the problems of water enrichment and chemical pollution.

"Eventually, it may be necessary to consider reversing the flow of some of our drainage canals to place the surplus water in the fresh-water marsh storage areas where the enriched waters may be advantageous instead of detrimental.

"Sewage and spetic tank pollution is always a problem and a strict control should be provided. A constant enforcement effort of existing and future laws on this matter is of the utmost importance.

"This community, as many others, may soon face the problem of thermal pollution in view of the fact that a proposed plan has been made to build a nuclear-fueled plant in our area.

"We feel that a survey of the effects of such pollution should be made and every reasonable precaution should be required to see that a proper means of precooling is devised and included in the proposed power plant expansion plans.

"These are some of our local problems with which we are concerned and which we respectfully submit for your consideration.

"Very truly yours, The Pelican Island Audubon Society, Mabel Michael, President."

That's the first one.

MR. TRAINA: Are there any comments on this one, before he goes to the other one?

MR. JENSEN: I have nothing.

MR. TRAINA: You have another statement for us?

MR. PARTINGTON: Yes, I do. This is the one that I am giving in the name of the Florida Audubon Society.

I am William Partington, Assistant Director of the Florida Audubon Society, an organization of 8,500 members.

Since we are traditionally interested in wildlife, their habitats, and preservation of as wide a spectrum of native species in healthy abundance as possible, we welcome the opportunity to make a statement at this meeting.

A number of rare and unusual species, such as manatees, porpoises, spoonbills, reddish egrets, seaside sparrows, five species of sea turtles, diamond-back terrapins and others, in addition to well-known sport and commercial shellfish and fish inhabiting these estuaries.

Of all natural areas, estuaries are possibly the most complex, since they are affected by inland water flow to tidewater, as well as the oceans, resulting in a complex of marshes, estuaries or bays, lagoons, sand and mud flats, and so on.

Pollution in this zone, therefore, comes from many sources, as well as created on the spot.

Fresh-water sources: The State of Florida has classified its streams to the degree of purity in accordance with the Federal Water Control Act.

As in the cases of most states, our rivers and canals leading to the estuaries are less than pristine, having been contaminated by municipalities, agriculture, land development, water management districts, flood control, individual landowners and private industries.

Recent amendments to the Florida Code for Water Control seem most desirable in this respect, including tertiary treatment of effluent (to 90 per cent) and periodic reclassification of streams as the degree of pollution is abated and these waters can be upgraded.

Other types of inland pollution affecting estuaries must include contamination by pesticides. The American bald eagle, the osprey and other piscicarnivorous birds here act as indicator species, as do certainly the oysters that were just recently mentioned.

Their successful nesting has declined drastically even where breeding sites have been protected from encroachment. In central Florida, the most significant existant population of eagles is now on inland ranches, where there is little need to spray with chlorinated hydrocarbons.

There seems to be more than a reasonable doubt that if we are to protect our fish and wildlife, and indeed, the human race, which is also piscicarnivorous to a degree, it is essential to encourage according to recommendations made by knowledgeable biologists in our Board of Commissioners.

We would also highly recommend that sutdies and recommendations of scientists, biologists and field workers in the Marine Institute of the University of Miami, the Federal Water Pollution Control Administration and the Bureaus of State Fisheries and Wildlife be encouraged and followed in these cases.

We have had contact with specialists in all of these departments and have great respect for the personnel and their advice.

Siltation from inland sources, especially through coastal canals, not only poses a continuing navigational problem in the estuaries, but also smothers the productive marine grasses in our estuaries.

This is caused by a great outflow of high water through super-efficient canals in many cases. If these canals were modified to be more natural, that is, had sloping sides, where submersed vegetation were established, were more torturous in shape or more crooked according to a seemingly derogatory term used in a recent water management report, if agricultural areas were encouraged to grow more ground covers to check erosion, and if back pumping to a central storage area were in operation, much of this problem would be controlled.

Unfortunately, in spite of past experience, work continues in digging canals to tidewaters. Many admirable words have been said, waving the flag for conservation, but concrete actions to preserve these areas are really missing.

Pollution at the estuaries -- causeways are one of the major causes of estuary pollution, we feel. Waters are trapped, cutting off circulation which normally flushed clear water through these tide-lands.

We recommend stronger controls on construction methods of roads crossing natural bodies of water. These roads should be set on pilings instead of using solid fill.

Another very great pollution problem arising in the estuaries themselves results from human development in the form of bulkheading, filling and dredging of estuarine, which has been elaborated many times today.

Anyway, we feel that certain plant communities, such as the mangroves, salt marsh grasses, and bottom vegetation which holds the land in place, absorbs and otherwise utilizes at least some of the materials flowing into tidewaters, but in the case of this destruction, there is a general reduction of animal life which feed, breed and grow there, and which also help to check the growth of these plants.

As others have pointed out, this ecosystem is among the most economically productive natural areas on earth, yet they have only recently been appreciated.

Control of destruction and pollution in Florida has been assisted by the passage of the so-called Randall Bill in the last legislative session, which now demands an ecological study of bottom lands considered for dredging and filling, et cetera.

However, to be truly effective, this Act needs more teeth. Not only should our State Cabinet consider the value of an area according to its productivity of submerged grasses, shellfish, or sport fish or commercial fish, but other considerations should enter the picture.

As individuals, the Florida Audubon Society has long appreciated the fact that birds, at least, utilize so-called "Barren mud flats" extensively for feeding, nesting and resting.

We have been told that the Bureau of Sport Fishing and Wildlife has sponsored studies to demonstrate the role of mangroves and other subtle facets of the estuaries in the total productivity thereof.

We encourage serious consideration of these studies in the issuing of future permits by the trustees of the Internal Improvement Fund and by the Corps of Engineers, both of which agencies have the power to control estuarial destruction and pollution, and perhaps stronger laws than the Randall Bill and the Memorandum of Agreement between the Corps and the Department of the Interior are needed.

In order to protect the areas from deterioration, the natural features that assist in controlling or obviating estuarine pollution, many of our members in coastal areas are actively encouraging their county commissions to set bulkhead lines at the mean high-water mark.

A few years ago, the trustees rejected such proposals as too conservative. However, times and values change, and knowledge grows.

We think it would be most important if the FWPCA joined us in assisting in endorsing this measure. Not only would vast bottom land be thus preserved, but areas of red mangroves, and even black and white mangroves, would be frequently preserved, adding to the productivity of these areas and removing the threat of waterfront pollution that arises as these areas are developed.

The oceans themselves are potential and sometimes real sources of estuarine pollution. Many coastal communities are building outfall systems which supposedly reach to the Gulf Stream, carrying sewage in varying degrees of treatment.

In some cases, in some areas of southeastern Florida, these systems are obviously not as effective in sending off sewage to another part of the world for somebody else to worry about -- as could be hoped for.

Some of the material washes back to the shores still in recognizable form. If this practice is to be permitted, certainly, this effluent must recieve a high degree of treatment, also.

Many larval crustaceans, mollusks and fish are known to be transported by the Gulf Stream and are released at varying points along out coast and even in Europe.

The sciences of oceanography and marine ichthyology are certain to oppose this practice, especially if some notable disaster occurs to fish populations or to people, which might create a terrific fury in the press.

We read of recent oil tanker mishaps where ocean and beaches are drenched with sludge. Stronger international safeguards seem to be needed for protection against such accidents, and new oil-controlling chemicals produced or made available.

In summary, we would urge the following:

That the FWPCA encourage more biolociagl, ecological and hydrological studies of our estuaries as soon as possible.

Many people will take a stand in support of the theory that our estuaries are valuable for fishing, recreation, commerce, and so forth, but will still permit and even endorse navigational projects, land developments and commercial enterprises that destroy these areas.

HR25, which would be a start in this direction and which would have given equal power to the Department of the Interior and the Corps of Engineers in dredging or permitting developments, is a start in the right direction, though it seems to be quite inadequately funded.

We would also encourage opposition to authorization of intracoastal navigation and large canals until studies have been made of the biology, ecology and hydrology of these projects.

Specifically, we are thinking of the so-called "Missing Link Canal," which could go to Sanford to Tampa, and this is of particular concern.

In this particular canal, the sport fisheries and Bureau of Wildlife suggested studies be undertaken, and they suggested a price of $425,000.

The Corps of Engineers has beefed that up to $600,000. Much information has already been accumulated on estuaries and more is forthcoming. The fisheries and wildlife, the Game and Fresh Water Fish Commission and several universities can assist this agency by supplying data and capable personnel for studies, and we, like the FWPCA, will be in constant contact with these agencies, provide them with funds, if possible, and assist them in requesting such funds.

We hope that the FWPCA will exert strong leadership in guiding zoning on municipal, county and state levels. Unfortunately, local zoning is often very fragile, and here, again, developments need very strong guidance.

In closing, I would like to say that we would enjoy offering our assistance in any of these measures in trying to provide information or disseminating information whenever such would seem practical, and perhaps we may even be able to supply information occasionally at a grassroots level. Thank you.

MR. TRAINA: Thank you very mucy, Mr. Partington. Are there any questions?

THE HONORABLE MR. REED: Mr. Partington, there are a couple of questions that I would like to ask you. You alluded to ocean outfalls. May I ask, did you use any background material in the preparation of your remarks on the subject of ocean outfalls?

MR. PARTINGTON: No, this is actually based on various items of concern that we have heard people express from tine to time that they think this idea of using the ocean outfalls would be fine, that the ocean outfalls could use these nutrients, provided they are treated sufficiently, but they are afraid that as coastal communities continue to develop, reaching the Gulf Stream may present a tremendous problem.

THE HONORABLE MR. REED: I think that everyone in this room realizes the importance of ocean outfall. If we don't put it in the ocean from Palm Beach out, it will go into the estuary.

Also, can you name a funded prestudy of a proposed authorized project, such as the "Missing Link," and I defy you to name one. It's a darned good idea to have studies before authorization, but I defy anyone in this room to name one that Congress has funded before authorizing.

There isn't such a one.

MR. PARTINGTON: Well, we do believe it would be appropriate to request of the Congress to authorize or fund -- to specify, say, the Department of the Interior, for certain studies to be made of the ecology of a certain area.

Perhaps this would be in keeping with HR25.

THE HONORABLE MR. REED: But the point is, at the moment, right now, there has, historically, been no single prestudy project before authorization. This is a matter the Congress must take up itself and must handle as it modifies its policy on how to authorize a project.

MR. PARTINGTON: Perhaps they could do it as a study grant, just simply to work on the study of ecology per se.

MR. JENSEN: I believe the Congress is now considering such a pre-study policy on the lower Mississippi project.

THE HONORABLE MR. REED: Is it funded?

MR. JENSEN: No.

MR. TRAINA: Thank you, again, Mr. Partington.

At this time, I would like to call on Mr. Newton Herrington, Manager of the Chamber of Commerce, Pine Island, Florida.

MR. NEWTON T. HERRINGTON: We have an island called Pine Island down in the lower part of the state. I don't know whether ya'll know much about Pine Island or not -- I'm no professor, I'm just the Manager of the Chamber of Commerce on Pine Island, and I have something here to say about pollution and about the dredging and filling.

Now, we have been fighting a battle down on Pine Island about this pollution and dredging and filling for a good many years. Now, let me give you a little background of Pine Island.

Pine Island is 17 miles long. It goes from San Carlos Bay, and from the bridge where you go across off the mainland, it's four miles from that to the center of the island.

This island is surrounded completely by water. We have Matlacha Pass on one side, we have San Carlos Bay on the south side, we have Charlotte Harbor on the north side, and we have the inland waterway on the outside.

Then after that, we have Lacosta Island, Captiva Pass, and Sanibel Island. We have a good conservation program going on in Lee County, and I have a couple of letters here that I would like to read and talk about this, because this is one of our bad problems.

This is a problem for everybody on Pine Island, and Fort Meyers and Lee County. Let me read two letters here, and then I would like to talk a little bit more.

The first one reads as follows:

> "Our Chamber of Commerce is vitally interested in all facets of conservation. We realize that pollution of our waters could become a great problem and wish to learn all we can to circumvent these problems as they may arise in our area.
>
> "We feel that the greatest danger to our estuarine resources lies in the indiscriminate dredging and filling of our submerged lands.

"Dredging destroys our bay bottoms, which are invaluable to marine life and filling, once accomplished, cannot be undone, no matter how much we wish it so.

"We, therefore, ask you to give long-range consideration to this great threat to the very things Florida stands for -- her tourists, so many of whom come for the excellent sports fishing and our commercial fishing industries which contribute greatly to Florida's economy.

"Sincerely, Mary Barnes, Chairman of the Conservation Committee."

I have another one here. Two years in a row at our Lee County conservation election, we have had -- let me read this first.

"Estuarine areas are the most productive areas per acre known to man. This and other facts were brought out by Bernard Yokel" --

He is a marine biologist at the University of Miami. He has been to Pine Island twice trying to help us. He has brought us films and showed us what we are headed into.

So, last year, we, the people on Pine Island, borrowed a million dollars from FHA and put us in a million-dollar water system. Now, that ain't solved the problem.

We have pollution that's about as worse as it is anywhere. I have a map here of the section, I believe, in -- to give you a little idea, a little idea of what it is -- this is only one finger, and in this one section, there are 500 lots.

In this big section, there are 436. Over here is enough to go over 500. These lots on this side are not -- some of them are 24 or 40 foot. These will go 40 and 50, and when you go to crowding houses -- now, this is completely full over on this side, and over on this other side, the first three streets are for trailers and them lots are filled.

There are more houses on a piece of ground right here than there are anywhere in the State of Florida. You see these fingers? This is all one piece. This is water on each side of it.

We have more sections than this. This is just one. Let me give you a little idea about what Pine Island is.

You cross the Pine Island -- we are getting a new bridge -- and you come into four of the biggest trailer parks anywhere, then you cross another bridge, which that is Porpoise Point, and that cuts off from what is called West Island.

West Island is where I live. Then there are two sections like this on West Island. Then, that is cut off from what is called Little Pine Island. Little Pine Island is uninhabited.

We have had trouble there. A man wanted to dig it out, so we got busy and stopped as much as we could.

Then Bokellia, which is on the north end, they have about, I think it's five, trailer courts up there, and one sits right on the end that has there 300 people in just one court.

If you can imagine how people are sitting out there on that little spot of ground, then you can imagine how the pollution is. The amount of people that is living in this one area should be stretched out over acres of ground.

It's not; it's just in a trailer park. And we do have a problem down here. We don't need nobody to tell us what has happened to us. We need somebody to help us got out of this mess. (Laughter)

But this Chamber of Commerce is going to work and keep a'working. I know you can't see this, but I wish you could. This is Pine Island right here. It is absolutely cut into with another stream of water.

Pine Island Creek comes in about half-way, and then it comes back out at Matlacha Pass. Mr. Yokel said this, and he said it twice, he said that Pine Island was the second-best estuarine area in the whole State of Florida.

And I'm going to give him credit for more than what he said. But we are going to lose it if we don't do something about it.

Lee County produces as much fish and shrimp as any county in the State of Florida. Now, I wish I had all my figures on this, because three years ago, I wrote to the state and got all the figures they had of what we produced in Lee County, and it was staggering, because Lee County does have them.

I know we have over a hundred net fishermen, and we are doing our best to see that we always have fish. Just to give you a little idea, yesterday I was crossing the bridge, the older brideg -- they call it the "fishingest" bridge in the world -- and they was catching fish -- everybody was -- shoulder to shoulder clean across that bridge.

But we know if there is not something done, that Pine Island will exist no more. Now, in the summertime -- I know this is not a fish tale; this is true, because my heart is in Pine Island, and I'm going to stay there as long as I can, as long as the fish last.

The last time I went fishing with my wife up in what I call the woods -- there are thousands of islands up around this Pine Island -- and I know that me and my wife throwed back over 25 reds and snook.

I only fish in the summer. That's the only time I get to fish, which is the best fishing. And we run fishing contests every year on Pine Island, through the Chamber of Commerce.

But the point I'm trying to get over -- and I'm glad to be here, because we're working hard trying to get something done about pollution.

If you can imagine, 300 houses sitting with anywhere from four foot to 20 foot to a canal, and then you get your summer tides, which are high -- they will almost go two foot higher in the summer than they do in the winter -- and you know as well as I know, that is a floating septic tank.

I do. So the other day, I had to go to the Court House to see the State Health Department. One of the big companies down there built two nice houses. One of them is a three-bedroom house and one was a two.

They wound up knocking a four-inch hole in the seawall to let the water out of the spetic tank.

Well, we went to the Court House. Finally, I got Mr. Smith, and he come out there -- he is over at the State Health Department -- but he finally plugged them up.

And I tried to get him to do something about the rest of the septic tanks that are running in the canal, and they made a statement.

They said, "Well, if you will tell us where they are at, we will go see about it."

Well, believe me, I'm not running the State Health Department. That's his job. And we are looking for somebody to do something about it, and I certainly thank ya'll for letting me come here and tell my little story about Pine Island.

THE HONORABLE MR. REED: I'm glad to hear about Pine Island. Who sets the bulkhead lines in Pine Island?

MR. HERRINGTON: I'm glad you asked me that. Let me tell you a little story I run into. I want to get this off my chest. (Laughter)

We really had a fight down there. We loaded that Court House twice. We can't beat a company with money; we don't try. But we can beat them with people.

Gulf American was going to take in nine miles from the bridge all the way into Charlotte County, and the only way we could stop them from doing that -- here's the point: It was staggering even to imagine.

They were going up to Matlacha Pass, going to fill in, and then cut back and go to the Charlotte County line and make two big wide canals and then fill in to put these homes.

Well, it's not my fault that Gulf American missed the boat. We got Pine Island, and we are going to hold that, boy, if we can.

THE HONORABLE MR. REED: The point I'm trying to make is, the Lee County Commission set the bulkhead lines at Lee County?

MR. HERRINGTON: That's right.

THE HONORABLE MR. REED: And if the responsible people of the county --

MR. HERRINGTON: Now, you're getting to the core. This was a buck-passing outfit for a while.

THE HONORABLE MR. REED: I think they're still a buck-passing outfit.

MR. HERRINGTON: What happened, one of the County Commissioners -- after I was up there begging and pleading -- it was not only me. Man, there was hundreds of them.

We got the County Commissioner to make a motion to pass a ruling that one foot be -- so far, that's held up. I don't know when he's going to come back.

THE HONORABLE MR. REED: Well, I think you can also do something about your sanitary district. At a county level, if aroused citizens get together and demand the cessation of cesspools, well, I think it's fine time that Lee County's Commissioner heard the people there in the county and got busy doing some of these things.

MR. HERRINGTON: I was talking with one of the County Commissioners last night, and I asked him when one of them was coming up here, and he said he was sending a letter.

MR. THOMAN: Thank you, Mr. Herrington. I would now like to call Bill Lund, Chairman of the Water Resources Subcommittee.

MR. BILL A. LUND: Thank you, Mr. Thoman. I would like to start off with my own views. Florida has a vast network of estuaries that make up our most important asset.

They must and shall be protected. The sleeping public has been awakened and is damanding that action be taken. Primarily, this is a responsibility of the State of Florida and will be so assumed.

We also recognize that we are an important piece in the overall jigsaw puzzle formulating the United States of America. It is on this premise that I must start my thoughts.

In a layman study of Florida's estuarine problems, I think there are several points that should be brought to focus.

The major ones, not necessarily in order of their importance are as follows:

1. There are adequate laws concerning pollution, but the penalties for violation of these laws are grossly inadequate.

2. A more defined route should be laid out to help the municipalities and communities to achieve the goals for cleaning up and enhancing our estuaries.

3. The after-the-fact deeds granted by the trustees of the Internal Improvement Fund, as they now exist, must be abolished; the penalties currently imposed are ludicrous.

In too many instances, if the operator moves fast enough to fill state-owned land without a permit, he can acquire public land for personal gain at the expense of the general public.

4. The operators of all sewage-treatment plants should be licensed, bonded or otherwise limited in such a way that they will not be allowed to pollute the estuaries under the guise of breakdowns in equipment or faulty operation.

5. All now established bulkhead lines throughout the State of Florida should be reevaluated and returned to the mean high-water line; unless some unusual condition makes it in the best public interest to be elsewhere.

Also, all fill should be obtained from an upland source. The only exception should be for public projects.

6. There are many areas of our state that have great value to the future if they are set aside as inviolate dedicated areas in which no interest that is not completely compatible should be permitted.

7. The State of Florida has begun a program for beach erosion which involves maintenance of inlets. This program should be continued and expanded for erosion is a state responsibility and is directly affecting our estuaries.

Strong consideration should be given to minimize adverse effects on inshore waters.

8. Recent water shortages inland and in the Everglades region have brought to focus our errors in previous planning. Canalized drainage into our estuaries has resulted in irreparable damage, not only to these areas, but also in the waste of valuable fresh water.

Obviously, we must attempt to correct these conditions as soon as possible. In all future plans, all aspects must be considered, not just drainage alone.

These are but a few of the problems confronting us all today, and as you will hear many more from all corners of our state, may I close with my thanks for this opportunity to present a personal observation.

MR. THOMAN: Thank you very much, Bill. We certainly appreciate it.

MR. LUND: I would like to put into the record one more letter by reading it to you, if I may.

MR. THOMAN: Go right ahead.

MR. LUND: This is from the Loxahatchee River Chapter of the Izaak Walton League of America. It reads as follows:

> "The Loxahatchee River Chapter of the Izaak Walton League of America has assumed the responsibility of keeping the values of our natural resources before the public.
>
> "Our area of Jupiter Inlet, Jupiter Sound, the Loxahatchee River and surrounding territories has a potential of outdoor recreation unsurpassed for the future, in this unique section of the southeast coast of Florida.
>
> "It is relatively unspoiled by man's development to date, but there are needed safeguards to insure its proper place in the future:
>
> "1. Dredge and fill operations should only be permitted when required for total public welfare.
>
> "2. The remaining valuable mangrove areas should be protected.
>
> "3. Areas of the vegetated shoreline should be zoned so as to preserve existing tidal beaches and shorelines, which are essential to the ecology.
>
> "4. Navigational channels should be located and constructed with great concern for the flats and oyster bars. At present, these channels do not require a biological survey, and often a slight relocation or realignment could preserve valuable nursery areas.
>
> "5. The sale of state-owned bottom lands should be prohibited and only title changes permitted when necessary for public usage.
>
> "6. Municipal, industrial or agricultural pollution should not be tolerated. It is far more economical to correct our errors now, before the more visible signs tell us it is too late.
>
> "7. The pristine headwaters of this unspoiled river should be fully protected in their present state to insure tidewater ecology.
>
> "Thank you for this opportunity to express our views on this most important estuary. More detailed information will be furnished at your request.

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"Sincerely, Harry H. Kuck, President."

MR. THOMAN: Thank you.

MR. PATTON: I wonder if you have any suggestion what the realistic penalties should be for pollution.

MR. LUND: I feel that in many instances we are not taking a long view of what is actually being damaged by some of our pollution. I feel that we should make the penalties to such an extent that it's going to be a lot easier to clean up than it is to violate.

We have laws right now that are on our books by the State Board of Health, but the enforcement and the penalties that have been put through our statutes in the past have not been very effective.

MR: PATTON: I just wonder if you want to make any concrete statement about the improvement --

MR. LUND: Not at the present time, but I will be following it closely, you can be assured.

MR. THOMAN: Next, I would like to call Mr. W. L. Barnes of Crystal River, Florida. Are you representing the City or the War on Weeds Society?

MR. W. L. BARNES: I will explain it to you.

MR. THOMAN: Thank you, sir.

MR. BARNES: I am W. L. Barnes, a resident of Crystal River, Florida, and officer of the War on Weeds Society, Inc. , a recent Florida corporation, having received our corporation status last month.

The Honorable Stuart Ayers, our Mayor, is one of the charter members of the corporation, and he asked me, as a representative, to make a statement.

My statement will be the letter that I wrote Mr. Thoman.

At the request of Mayor Ayers we are writing you regarding a statement to be made at a public meeting to be held in Orlando, Florida, on March 12th and 13th.

The economy of the Crystal River area, dependent on casual tourist trade, and the building of residences by part and full-time retirees, is seriously threatened by the prolific growth of the aquatic weeds, Elodea and Milfoil.

This growth is taking place in all of the bays, canals and the main river. The weeds plug the canals and bay areas, hinder the movement of boats, deplete fishing and destroy bathing areas.

As evidence of pollution being discharged by Crystal River into its estuary, our promising oyster industry had to be abandoned. It is not an exaggeration to comment that the area extolled by many national publications as a "fisherman's paradise" may soon become a "paradise lost."

The Crystal River area -- see attached brochure and map, "Suncoast Springs Area" -- shows a population of some 3,000 inhabitants clustered around beautiful spring-fed Kings Bay and its connection to the Gulf by seven-mile-long Crystal River.

The aquatic area is unique and beautiful beyond belief. It offers excellent fishing for all fresh and brackish water species and provides in a few minutes, by boat, access to the salt water species that abound in the shallows, around bars and in the deeper water of the Gulf.

The bay provides protected fresh-water anchorage for boats with quality marinas, motels, hotels and resturants ashore.

A technical appraisal of the pollution and weed growth problems of the area is given in the attached "Report of Citrus County Aquatic Weed Committee as Made October, 1967, to the Citrus County Board of Commissioners."

Noteworthy is the technical data limited to experiments with such chemicals as copper sulphate and with concentrated sulphuric acid. The use of cutting and gathering machines has been tried with poor results.

We now find motels and hotels reporting constant complaints from vititors, to wit: "We are not coming back until those weeds are under control."

The residents of the area are at last thoroughly aroused and are making a concerted effort to attack conditions through a nonprofit, charter organization called, "War on Weeds Society, Incorporated."

The goal is a membership of 1,000 households. In addition to private contributions, massive aid will be solicited at county, state and federal levels.

The immediate problem is the control of the weeds Elodea and Milfoil now enhanced by pollutants such as raw sewage, silt and weed residues. Recommendations are:

1. Stop the dumping of raw sewage into the bay and river.

2. Control silting by legislation that prohibits the digging of open-end canals, that is, dig blind and allow settling before unplugging.

3. Investigate and place into practice proper methods for aquatic weed control.

The lifeblood of the area of Crystal River is not manufacturing, but primarily, recreational. However, we do have under construction quite a sizable power plant, and we understand it will be nuclear-produces power in the foreseeable future, and I personally would like to have any and all reports on this type of pollutant to be sent to our Mayor, if I may, please.

MR. THOMAN: We will see that he gets a copy of the record.

THE HONORABLE MR. REED: I would like to know -- and I'm sure Mr. Patton would like to know -- the location of the raw sewage discharge in the Crystal River.

If you could drop us a letter --

MR. BARNES: One of the biggest areas is the number of inhabitants in houseboats that I understand have been told to get out, and they are still there.

THE HONORABLE MR. REED: Who has told them to get out?

MR. BARNES: I understand Health. Now, where in the health level, I don't know.

THE HONORABLE MR. REED: We are very concerned with this discharge of raw sewage from boats, and I think we are getting somewhere. I hope you are aware of the tremendous effort that has been made in the Aquatic Weed Committee of Governor Kirk, which has spent now almost 14 months at work on this problem and has made numerous presentations in your area.

MR. BARNES: I haven't geen involved until, shall I say, a month ago. However, from what I have been able to get through some committees I have appointed, there are some 37 agencies in the state all involved in weed control.

THE HONORABLE MR. REED: That's the public project that the committee has to bring it under, a unified volume head. A little bit of spray isn't going to do it any good.

It's going to take some mighty good effort. When I was over there last summer, I spent four days on the river. I could find nobody in the neighborhood who gave a darn, and that was the most difficult thing for me to believe, that here on this gorgeous river, completely clogged with weeds, the local residents themselves didn't give a darn.

MR. BARNES: I have our corporation charter with us. I have our bylaws, and in the period of one week -- as of last night, we have 190 paid memberships.

THE HONORABLE MR. REED: Wonderful. Send me a list. I would like to be the 191st on your list.

MR. BARNES: I have a registration card.

THE HONORABLE MR. REED: Right. Write it right up here. I hope you get to that thousand figure easily. These are the things at the local level that people have got to get excited about.

MR. BARNES: We naturally believe we have got to do our share, but we don't have the resources to make the studies.

THE HONORABLE MR. REED: We understand that, and that is why the Legislature was very nice and appropriated us a little extra money for this, and we are very, very -- we are looking very hard at bringing our weed control policy under a single head, and at the same time, getting some very basic research done on Elodea and Milfoil.

MR. BARNES: I have a Technical Committee that is working with Ph.D.s, chemists and so forth, that have donated their services, and so we are doing some research on our own.

MR. THOMAN: I was very happy to know that there were 37 agencies in the Florida government. It can happen in state government, too. (Laugheer)

MR. BARNES: All I know is what I read in the paper, and that is the number they came up with.

MR. THOMAN: It's 5:00 o'clock, and we will probably go on until about 5:30. Is there anyone who asked to be heard today who just can't possibly stay until tomorrow?

MR. ALEX KAISER: May I please make my presentation?

MR. THOMAN: Come right on up.

MR. KAISER: Mr. Reed and distinguished gentlemen: The estuarine waters of the Tampa Bay area are of paramount importance to Tampa Electric Company, and its employees and its customers -- the general public.

This estuary of the State of Florida is the focal point of the Tampa Electric Company service area, providing aesthetics, recreation, industrial sites, low-cost transportation, weather moderation, fishing and many other benefits.

These waters are largely responsible for providing low-cost electric energy to the area. The navigation waters provide inexpensive transportation of fuel, which is the single largest item of expense in the production of electric power.

The vast bay waters also provide large volumes of cooling water required for power plants.

The lack of scientific knowledge about the effects of temperature on marine life in the warm waters of Florida has created a tendency of conservationists, federal authorities and other groups to make arbitrary generalizations concerning cooling water uses by industry.

Our experience over a long period of time indicates that carefully designed power plants do not harm the marine life in Tampa Bay estuarine waters, but, instead, attract marine life, and the effects, therefore, seem to be beneficial.

A preliminary investigation by Dr. James B. Lackey, recognized ecologist, tends to substantiate our belief. We plan to continue to make systematic scinetific studies in this area of concern.

The best interest of the public would not be served if Tampa Electric Company were requried to use a cooling source other than salt water, based on the premist that any change in environment is destructive.

Alternate methods of cooling can result in the taxing of the bay area fresh-water supply, which is a more important natural resource.

Our Gannon Station, located on Tampa Bay waters, is the largest power plant in the State of Florida. Several thermal investigations have been conducted at this station and the zone of thermal influence of this plant is less than three one-thousandths of the area of Hillsborough Bay.

From a volume standpoint, one change in tide moves approximately 20 times more water than 24 hours of plant operation.

On the thermal studies around Gannon Station, we are cooperating in an exchange of data with the local Federal Water Pollution Control Administration Laboratory and are willing to continue and intensify this cooperation with local, state and federal agencies.

In summary, we wish to point out that Tampa Electric Company has a legitimate need as a water user and should be given full and adequate recognition as such.

In over 60 years of operation, the record of no knows damage should not be dismissed in favor of some unfounded postulations based on fear.

An apparant desire of some to find a single answer to cover all situations appears to be an irresponsible approach that would burden the customers of Tampa Electric Company with increased electric bills with no environmental benefit and deplete the fresh-water supply needed for future generations.

Submitted are studies, charts, calculations and other data in support of this statement from an independent laboratory, Federal Water Pollution Control Administration and other sources.

In summary, the ecology investigation by Dr. James B. Lackey, we believe, tends to substantiate over 60 years of experience and observations concerning the marine life in the waters adjacent to our power plants.

The lack of fish in our discharges has not been the problem. The problem we have had is an overabundance of fishermen.

The local press has noted the favorable effects of our Gannon Station. We have noted that an article written by a fishing editor described a smiliar effect by the power plant of another utility on Tampa Bay.

The use of cooling towers is not a cure-all, as their application presents several serious problems. The economic burden is extremely high. For a modern plant of four-million-kilowatt capacity, this burden could be equivalent to 40 to 60 million dollars.

A cooling tower has an extremely high consumptive use of water, and the make-up water must be of reasonable quality.

For a modern plant of four-million-kilowatt capacity, the fresh-water consumption could be approximately seven million gallons per day. Because of its high evaporative losses, the plume from a cooling tower may become objectionable to the public.

In addition to this formal statement, I just want to reemphasize our desire to cooperate, and we intend to continue our studies. Thank you very much.

MR. THOMAN: Thank you very much.

MR. TRAINA: You indicated you were the largest power plant. Is this in terms of power plant generation?

MR. KAISER: I believe this is the largest in Florida at the present time.

MR. THOMAN: What do you think about the suggestion that was made by Dr. McErlean this afternoon that in the future for location of your plants, electric generating plants, that regulatory agencies be called in before they are cited?

MR. KAISER: I would think in that area, as we have indicated here, we are willing to cooperate with studies with anyone.

MR. TRAINA: One other very intriguing recommendation or suggestion that I believe Dr. McErlean made and perhaps cited to the Tampa situation, at least for consideration, is combining the heat produced by your plant with the waste produced by the City of Tampa in producing fertilizers.

Has this any merit?

MR. KAISER: I think that's a very speculative sort of suggestion at this time. I haven't seen anything concrete from an engineering basis.

MR. TRAINA: Is Dr. McErlean here? I hate to put him on the spot. We have had a problem down there. The Federal Water Pollution Control Administration is currently studying the Tampa area, and this just came to my mind.

DR. McERLEAN: I know of two instances where combination has been suggested of this sort. One is in England, and I beleave the reseracher's name is Eels.

I don't believe this has been attempted in the United States. The speculation I made or presented before was just that we should be thinking in this direction and the combination, for instance, in the Potomac -- the processes could be worked faster if each were more varible.

I suggested before, a circuit, which is published in "Bioscience", showing organic nutrients, starting with humans going through a whole chain using heat to accelerate this and ending back up as a food product.

MR. THOMAN: It would seem to me that which all the great ingenuity of American industry, the minute that the electric power industry is forced to put in heating devices, that they are going to find some way of using all that excess heat that they are now throwing away.

MR. KAISER: I certainly don't disagree with you, but I don't like your term, "force".

MR. THOMAN: This has happened in other parts of the country, and it undoubtedly is going to happen in this part of the country, that the privately owned power companies are taking a natural course of business to meet water quality standards that have been established by the state, that heat dissipation devices are being put in.

In fact, the Public Service Electric and Gas in its quarterly stockholderl letter, has, some 15 to 18 months ago, casually mentioned that they are spending eight million dollars on two coolers on the Delaware River to meet the requirements of the Delaware River Commission.

And therefore, we probably have not had to worry about this amount of heat with the great growth of the electric industry, electric energy industry.

MR. KAISER: I would like to make one more comment, that I think we should first find out whether we have a problem, and then determine what the course of action should be, sir.

MR. THOMAN: You're probably correct on that. I think that there is a lot known about thermal death that points of aquatic biota, and this probably has not been gotten out of the research publications and into practical application, but I feel that you will find that it soon will be.

MR. KAISER: We are hopeful to have some information on this, and this is the reason we are attempting to study our specific cases, and I don't think we can say anything further than that.

MR. THOMAN: Thank you. I would next like to call Dr. Robert Dean of the University of Florida.

DR. ROBERT G. DEAN: I'm representing the Coastal and Oceanographic Engineering Department at the University of Florida.

In the interest of time, I would like to paraphrase some of my remarks that have been covered earlier. I believe that it was well established this morning that even though we do not have sufficient knowledge available, there will be interest in the future in modifying some of our estuaries -- this is either for land fill or perhaps construction of causeways.

I would like to direct my discussion today briefly to two aspects. One is what kind of data do we need in order to determine whether a proposed modification indeed is significantly harmful, and then secondly, a point that I think has not been covered earlier, and this is the point of what types of engineering sturctures, and I will only mention one -- they are probably more what types of engineering structures might be designed, let's say, after the fact, to help to improve the situation, and that it may be chalked up through the construction of causeways, et cetera.

Well, first of all, let's look at the problem of what kind of research should be carried out in order to attempt to evaluate the probable effect of construction or modification within an inlet.

I would mention here that I am an engineer, and I think that probably you should take my remarks in this context, because I tend to stress the engineering aspect more than the biological or economical.

I think, first of all, we do need a better knowledge of estuary mechanics. We might consider the general case of an estuary, and I think here, although it's not too typical, perhaps the Lake Worth estuary will serve as an example.

It's connected with the ocean and oceanic waters through two constricted inlets, and also has some fresh-water supplies.

Well, the forces that act on the inlet are primarily threefold, or three kinds: the tidal fluxes of the ocean and oceanic waters, which do serve to cause a tidal flux in and out of some mix with the less fresh or perhaps more polluted waters in the estuary, a partial renewal of the waters.

There is also the wind stresses, which act upon the estuary and can tend to cause a through flow in the estuary, whereas, the tidal flows, of course, do not.

Then finally, precipitation and run-off, I think we should also consider it as a force.

Well, I think the position today is that we really do not know, let's say, even -- even to a rough qualitative extent or perhaps I should say to a good qualitative extent to what the effects of these three individual forces are.

I think that quite a bit of research needs to be carried out on this aspect. In particular, we need to know what the effects of the various forces are.

Once we can establish this, then I think we have a capability then to assimilate the effect of a proposed modification, how it will affect some parameters.

Secondly, I think that we need to know, need to have available better claim to logical data for each of the inlets and to the estuaries, and in this, I would include the variability of the wind, the tides and also the run-off and precipitation that was mentioned earlier.

I think that this type of statistical data, if it were to be tabulated, could be used again with the knowledge acquired in the mechanics of estuaries that I have mentioned previously to again predict the effect of modifications to an inlet.

Thirdly, I think it has been mentioned quite frequently that the biological and chemical response to a proposed modification, to an estuary, needs to be studied.

The hopeful result of this type of an investigation would be a capability to predict for a proposed modification.

For example, we might find that the resident time, a particle of water in Lake Worth, under the existing situation, might be something like three or four months.

I really don't know, but if another causeway were built, expanding most of this estuary, you might find out that the resident time might be increased four or five months.

This would be very useful information in itself, and if we could then predict the effect on biological and chemical factors within the estuary, I think we would be better able to assess the proposed modification and whether it should be allowed.

Finally, I would like to again mention this apsect of engineered structures or solutions to existing unfavorable or undesirable situations.

Here, again, let's consider the case of Lake Worth, which, as I mentioned earlier, does have a very significant pollution problem.

It has been approached in the case of Lake Worth that conduits be placed beneath Vero Beach, connecting Lake Worth Inlet to the ocean, and these conduits would be quipped with flap gates which would, in essence, serve as check valves, allowing the oceanic waters to flow into the estuary on the flood tide, and then they would flow through a series of tides or continuous operations, such as this, the more polluted waters would greatly be dispersed.

I think this is not a point that has been brought up today, and it is a very plausible solution to some of the problems that exist that perhaps should be investigated further.

It does sound like an expensive type of solution, and indeed, I'm sure it would be. But if we do recognize that our inlets are valuable resources, whether it be for recreational or food production purposes, then I think that a solution of this type in the future will come into place.

In fact, there is a situation which seems ready-made for this type of a solution, and this is the locks which separate Port Canaveral from the Banana River, and here, again, it has been suggested that these locks be operated either on the ebbtide or on the flood tide thereby gradually replacing the water within the Banana River.

I think that this study could be carried out with very little expense, let's say, and would tend to indicate the feasibility of this type of program.

There are a lot of tentative effects that could result, of course -- the fact of navigational problems within the port, the possibility of inlet problems further south, Sebastian Inlet where Banana River is connected to the ocean, et cetera.

In conclusion, I would like to express my appreciation for being here, and I would like to again hope that some of the research that is funded through the Clean Water Restoration Act of 1966 will be directed towards developing techniques for assessing the impact of proposed modifications on estuaries, and secondly, on evaluating the beneficial or possible beneficial effects of engineered structures on existing situations. Thank you.

MR. THOMAN: Thank you, Dr. Dean. Are you going to submit your complete statement for the record?

DR. DEAN: Yes. I don't have it finished, but I will send it to you.

THE HONORABLE MR. REED: Dr. Dean, I am always glad to have somebody from the Coastal Laboratory. Are you presently working on a remodification of the South Lake Worth Inlet?

DR. DEAN: No, we have a project with Water Resources Reserach Center in which we are studying the first aspect I mentioned, that is, the mechanics of estuaries.

THE HONORABLE MR. REED: But are you working on the inlet which you designed for them?

DR. DEAN: Not really working on it. We are folloiwng it, yes.

THE HONORABLE MR. REED: And the same study -- did that come through your office?

DR. DEAN: Yes.

THE HONORABLE MR. REED: Are you pleased with that one?

DR. DEAN: Yes, we are. And we are starting a Jupiter Inlet sutdy.

THE HONORABLE MR. REED: May I point out, that a way to clean up the water of Lake Worth is to pump or pipe clean water from the ocean from offshore Palm Beach to inshore Palm Beach.

If we cleaned up the pollution in Lake Worth, we wouldn't need to have a pipe underneath Palm Beach. That is really the disgrace of Palm Beach, is that they have let their water become so polluted that it cannot be used for bodily contact.

I agree with you 100 per cent, and I hope the State Road Department is much more enlightened now than it was a few years ago.

MR. TRAINA: Do you think we are going to have to study estuaries one by one?

DR..DEAN: I think we will very soon be able to simulate estuarine systems on a numerical model basis. In fact, we plan to do this for Lake Worth.

We are conducting our first field trip tomorrow, as a matter of fact.

MR. TRAINA: Maybe you could give us a little idea of how much more is involved in estuarine studies as opposed to fresh-water studies.

DR. DEAN: You mean in terms of dollars?

MR. TRAINA: Yes. Is it three times as much, ten times as much --

DR. DEAN: I think it is on the order of three times as much.

MR. THOMAN: Thank you a lot, Dr. Dean.

With that, we will conclued this session of our proceedings and see you back at 9:00 o'clock tomorrow morning.

(Whereupon the meeting recessed at 5:27 o'clock p.m.)

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WEDNESDAY MORNING SESSION

March 13, 1968

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The public meeting directed toward obtaining contributions from Florida interests regarding the National Estuarine Pollution Study being conducted by the Federal Water Pollution Control Administration convened in the Granada Room of the Park Plaza Hotel, Orlando, Florida, Wednesday morning, March 13, 1968, and was called to order at 9:00 o'clock a.m. by Regional Director John R. Thoman, Southeast Region, Federal Water Pollution Control Administration.

MR. JOHN R. THOMAN: Well, the third session of this meeting will be in order. Mr. Reed, unfortunately, had to leave. He came in with strep throat yesterday, and it didn't improve overnight.

In fact, he was running a substantial temperature this morning, and he is now taking off for home and hopefully will be better.

But we are graced with the presence of Senator Randolph Hodges, the Director of the Florida Board of Conservation, and Senator Hodges will be a member of the panel, at least through noon today.

This morning I will first call on the Honorable John Robert Middlemas, member of the Florida House of Representatives, from Panama City, Florida.

REPRESENTATIVE JOHN ROBERT MIDDLEMAS: Thank you, sir. Gentlemen, I am John Robert Middlemas, member of the Florida House of Representatives from Bay, Gulf and Calhoun Counties in the coastal areas of northwest Florida.

I will only take a few minutes of your time, since I cannot give you expert testimony as to the degree of, or the effect of, estuarine pollution in my area of Florida.

I can tell you, however, that there are few public issues that the people who live in coastal northwest Florida are more interested in, than in the question of preserving the purity of the waters of the rivers, bays and bayous of our area.

I think that I can say for these people that they are willing to make considerable sacrifices to guarantee that these waters remain clean.

I think that our citizens are no longer going to tolerate the placing in these waters of any substances that harm fish or shellfish or wildlife, nor anything that makes the waters unsafe or unattractive for swimming or other water sports, nor any matter that might accumulate in the water or on the bottom or on the shores that will detract from the natural beauty of these estuaries.

Further, I feel that the people of my area are calling in no unsure terms for an end to many of the dredging and filling projects that threaten these bodies of water.

No longer are private concerns or governmental agencies going to be able to sell projects that fill or drain swamps and marshes, or dredge or fill irreplaceable bottom lands; no longer are they going to be able to carry out these projects in the name of progress without being questioned by the people.

The people of Florida are saying that sometimes marshes and bays and bayous and wild areas are more important than barge canals and housing developments and marinas.

I feel sure, gentlemen, that the people of my section of Florida are going to demand that their government take the steps that are necessary to preserve the areas.

I think that they feel that their state government is best equipped to protect these lands. But I know that they are not going to put up with any lack of action by our state government.

If it fails to continue to act to protect these assets, then our people will turn to the federal government. But, gentlemen, I do not think that that will be necessary.

I have faith that Florida's Legislature and executives are going to meet this challenge. I am confident that our state government will take the lead in instigating and carrying out the programs necessary to eliminate and prevent estuarine pollution.

I am also sure that our government will seek the cooperation and help of federal agencies interested in this project, for we realize that in few other areas of government is there as much need for federal-state cooperation as there is in this area.

I know that through such cooperation, we must carry out programs that will insure that this state will keep its estuaries pure for following generations.

Gentlemen, I am very pleased that this study is being made. I am sure that it will contribute to the preservation of one of Florida's greatest assets, its coastal waters and marshes.

Thank you very much for letting me appear before you.

MR. THOMAN: Thank you very much.

MR. JENSEN: Thank you very much.

MR. THOMAN: Senator, would you like to call the state agencies now that wish to testify, or would you like to present your statement?

SENATOR RANDOLPH HODGES: I will be happy to present my statement.

MR. THOMAN: Is Senator Henderson here? If he is, we would call on him first.

SENATOR WARREN HENDERSON: I have no statement to make at this time. I gave you a statement this morning.

MR. THOMAN: Thank you, and we are glad that you are here.

Representative Tillman, would you care to make a statement?

REPRESENTATIVE JIM K. TILLMAN: No, I just came to listen.

MR. THOMAN: Thank you. We are very happy you are here.

SENATOR HODGES: Mr. Chairman, ladies and gentlemen: On behalf of the Florida Board of Conservation, which is composed of the Governor's Cabinet, I would like to welcome you to Florida and to tell you we are glad that you are here, and we hope that your agency and the appropriate state agencies of Florida can work together satisfactorily in resolving the identified problems in these areas of responsibility.

Mr. Chairman, I also have a statement for the Southwest Florida District.

MR. THOMAN: We will accept it for the record.

SENATOR HODGES: State agencies assigned responsibilities by Florida law to protect, develop and manage the water-related resources of the state are represented at this conference.

We are not only anxious to hear of any water-related problems that may be suggested here for consideration, but we are pleased to be able to give you a summary report on the many areas that have been of concern to the state.

In some of these areas, we can report noteworthy progress; some are areas where we are now applying great effort; and some are areas where we may be able to progress more rapidly in cooperative or joint efforts with your agency.

There are some areas where we will appreciate receiving your attention, and there are other areas of state responsibility where your advice or suggestions may be welcomed to assist in the execution of our responsibility.

Florida is normally a water-conscious state. The state residents early recognized that our existence and our future depend on the wise use and good management or conservation of our water resources.

State legislative actions have probably been more conspicuous in this area of responsibility than in any other single area of responsibility of state government.

The Legislature and the agencies of state executive government have been alert to all matters of importance relative to water and have followed the sound advice of recognized and qualified professional engineers and experts on water matters.

Practically all water-related responsibilities of the state are coordinated and supervised at state government level in one agency to assure implementation of a unified policy of developing and managing the water resources of the state for the maximum reasonable and wise use for all the people of the state.

To achieve this end, the responsible state agencies have cooperated with the federal agencies concerned in all matters of development and use of the water resources.

We are anxious and willing to heed the advice of federal agencies and other experts in this field.

Because of the rapid and tremendous growth in population and expansion of the economy of Florida, there will continue to be an ever-increasing demand for use and conservation of fresh water in the state and for development of marine-oriented commercial facilities in the form of salt water fisheries, ports, navigation channels and waterways, as well as expanded requirements for recreational facilities on both fresh and salt waters of the state.

In meeting these growing requirements of industry, commerce, urban development and recreation for the expanding population of the state, Florida is fortunate in that the State Legislature has placed responsibility for development, use and conservation of these many interrelated water resources, including beach and shore protection, waterways development, geology, water resources and conservation, salt water fisheries and marine biology, all within one state agency, the Florida Board of Conservation, under direct supervision and control of the highest level of state executive government, the Governor and Cabinet officers of the state who comprise the Board of Conservation.

Under this arrangement, we are able to weigh the many factors bearing on the development, management and use of these resources, and in consideration of the economic and social needs of the time, to arrive at solutions that are in the best overall long-range interest of the total public needs.

Matters of primary concern to the state and the nation, as relating to use and conservation of the estuaries in Florida, are discussed in outline form herein, under relevant subject headings.

One vital function that estuaries must serve is the distribution of flood waters, particularly those collected in flood-control projects.

Lack of adequate storage areas to hold flood waters makes it mandatory to provide for some of these discharges through the estuaries so this requirement must be recognized in all estuary planning to include the water quantities and conveyance facilities.

Flood discharges are being minimized by holding or back pumping into storage areas, but some flood waters will have to be discharged through estuaries in years of excessive precipitation.

This is a matter of concern that state agencies are already working in full coordination with responsible federal agencies and requires no additional consideration by any other agency.

Fresh water is needed for maintaining brackish conditions so essential in estuaries for spawning and feeding. Perhaps this fresh water could be secured from the mineralized waters in some of our deep aquifers which cannot be used for agricultural or municipal needs.

Such mineralized water might be used during drought periods for establishing the proper salinity levels in the estuaries, instead of using the critically short fresh water. This water conservation possibility deserves research and study.

The possibility of converting some portions of estuaries to fresh-water lakes to provide reservoirs must be considered in Florida because of the lack of fresh-water storage reservoirs so essential to protection against salt water intrusion in some highly developed areas.

Such fresh-water conservation proposals must be fully evaluated to recognize the importance of both the estuaries and the fresh-water storage requirements.

With the abundance of estuary areas and the relative few sites where fresh-water impoundment could be considered, this should not cause a problem except in emotional conflicts when the facts are not fully understood.

The possibility of salt water intrusion into fresh-water aquifers from estuaries through streams or canals demands constant surveillance and sometimes requires salt water barrier structures.

Here again is a careful balancing of the needs of the estuaries and those of the fresh-water sources.

This situation is being constantly studies by all state and federal agencies concerned and requires no additional attention.

A number of circumstances, but particularly an unusually favorable combination of geographical and meteorological features, have made Florida's estuaries potentially the most productive in the United States.

Our scientists early recognized that, if these immense resources were to be properly managed and profitably used, prolonged, intensive and serious study would be required.

After the Second World War, investigations were sponsored by the Florida Board of Conservation in the then-fledgling Marine Laboratory of the University of Miami.

These grew in number and scope until, in September of 1955, the board opened its own laboratory in St. Petersburg.

During the ensuing 13 years, the stature of the scientists that worked there, as well as the product of their labors, established this institution as the foremost center of estuarine studies in the world.

Year after year the treatises, reports, articles, pamphlets, journal papers and books gave dramatic evidence of the great wealth that lies beneath our shallow coastal waters in and about the rich areas where fresh water commingles with the oceanic masses.

The areas near river mouths are economic giants from many standpoints, and frequently the greatest value of a particular use is derived at the expense of another resource.

So, competition and conflict characterize the administration and management of the vast enterprises of our estuaries.

As a result, the regulation, conservation and wise use of our underwater heritage has been slow in many cases and usually less than perfect. But the public has begun to realize that a continued use of their resources will depend upon the protection received.

In the last session of the Florida Legislature, for instance, an act was passed that requires a consideration of conservation in any application for a coastal development.

Dredging and filling will henceforth be obliged to proceed along lines calculated to preserve the valuable nurseries and sanctuaries that are so vulnerable in estuaries.

Inasmuch as our own scientists are preeminently qualified to provide the factual information needed to properly design protective measures, there is certainly no need for federal biologists, far less versatile and competent to deal with our waters, to give obligatory consultation or prescribe standards of management.

On the other hand, when the plans for regulation that are produced in our laboratories are not followed, joint action involving more than one level and/or branch of government may be desirable.

But this cooperative effort should be initiated by the state, not imposed from Washington.

In order to give some measure of the magnitude of the resources we in Florida presently enjoy -- and greater use and values may be expected each year -- we attach hereto a copy of commercial landings for 1966, and a reprint of a report on the sports fishing industry printed in 1958.

The monetary values of the latter are three to four times those cited -- even without reference to health of the participants and rebuilding of human vigor that were affected by the activities.

Roughly, the sports-fishing enterprise is worth at least 500 million dollars annually to the economy of our state.

The relatively smaller values shown for the commercial fishing industry are unfairly minimized by the method of appraisal.

Due to practicality, all fishing production statistics have historically been gathered at the point of landing, so reflect the price paid to the fisherman.

But the value -- not shown in the report -- increases each time the product is handled, iced, cleaned, processed, breaded, frozen or packaged. The final value of the industry, economically, is the price paid by the consumer.

Accordingly, the commercial fishing industry is worth, at least, 150 million dollars a year to our economy.

Also attached are lists of publications that include many of the over 250 items that have been brought out which reflect our capabilities in dealing with estuarine problems.

Other lists might be made and would include additional items, but the two catalogues we attach will indicate the scope of our activities in this area.

An up-to-date listing of scientific publications of the Florida Board of Conservation pertaining to salt water fisheries and research, all relating to estuarine problems and considerations is being compiled for reference and will be forwarded, when completed, to the Federal Water Pollution Control Administration.

We stand ready to apply our technical proficiency to any problem that may develop relating to our vast brackish water regions and to cooperate with any person, firm or governmental entity that is interested in developing and protecting estuaries. After all, we know better than anyone else their great value.

Estuaries may be used for sport and commercial fishing, general recreation, industrial cooling, extraction of petroleum, natural gas and shell, deposition of effluents, navigation and transportation, ports and harbors, homesites and industries.

Multiple uses and users frequently cause competition, problems and contention. Dredging and filling to convert shallow submerged land into profitable waterfront real estate has caused the major conservation controversy in Florida.

Shallow submerged land filled represents the conversion of marine environment into upland. Shallow submerged land dredged represents the loss of seagrass beds, marine soils, shellfish and fishing grounds, and overall marine productivity.

Additional submerged acreage, neither dredged nor filled, may be affected by resultant siltation that can smother marine life.

Without or despite conservation surveys and reports, 22,551 acres of sovereignty submerged lands were sold by the State of Florida from 1955 through 1965.

Other large sales of submerged land were made in the 1920s. Most of these sales led to dredging and filling to create waterfront real estate, particularly in south Florida, where urban growth has been concentrated since World War II.

To control the use of bay bottoms and prevent continued damage to the estuaries of the state, the 1967 session of the Florida Legislature passed the Randall Bill that amends the State Bulkhead Act and requires conservation surveys and reports for all private and public applications involving bulkhead lines, submerged land purchases and dredge-fill permits.

Before the state, cities, or counties act, the applicant must have in hand a conservation survey and report that advises him of any potential adverse effects of coastal development projects on marine life, habitats and fisheries.

Furthermore, the applicant wishing to use or exploit submerged land must bear the cost of these conservation surveys and reports.

To complement this important new legislation, a state system of marine preserves patterned after the one established in Estero Bay will be urged to the next Legislature.

Such estuarine areas included would be inviolate from urbanization and industrialization, but the public could continue using them for sport and commercial fishing and general recreation.

It appears timely to plan and zone for conservation and establish priorities in using the estuaries. Such facilities as marinas, navigation channels, power plants and ports need to be in, or on, the water, but intrusion into estuaries of expressways, golf courses and subdivisions will be questioned by the state.

Such encroachments may be allowed in areas already badly damaged and beyond early rehabilitation, but unspoiled habitats supporting the sport and commercial fisheries, nursery grounds and the birds and wildlife habitat of the state should be saved to the maximum reasonable extent for enjoyment of future generations.

Such zoning should not permit estuaries to be used as borrow areas for cheap fill material or as dumping grounds for the undesirable by-products of cities, farms and factories.

These zoning considerations are planned to be taken up by the next State Legislature.

There are inadequate state, federal and international laws to enforce pollution control measures and to delineate responsibilities for ships that use state ports and sail the international waters.

Establishing state laws for one state will not solve the problem. There should be a uniformity of state laws, applicable to each state, developed for enactment by each State Legislature, which laws will apply when ships are within state waters and ports.

There should also be other laws applicable to those ships when sailing in international waters which will fix responsbility for damages without getting lost in the involved international laws and procedures normal to ship registration and operation.

The FWPCA could serve a worthwhile purpose by sponsoring such action, with participation by the states concerned.

Bays and estuarine areas lying behind barrier islands are dependent on flushing to keep clean by an exchange of water between the bay and the ocean. The water passes through inlets between the bay and the ocean.

The flushing action of the high and low tides will cause the exchange of water, provided the inlets are kept clear of eroded material from adjacent beaches.

Removal of these blocking shoals of the eroded beaches from the inlets and bays is necessary for the bays to flush themselves. A survey by federal authorities of some such areas may result in an improvement in selected areas.

Such action could also benefit shores and beaches by rebuilding them with their own eroded sand.

I would like to present our statement, and we have adequate numbers of copies. Mr. Chairman, if there are any questions, I, or some of my staff that are present, will be happy to attempt to answer them.

MR. THOMAN: Thank you, Senator. I have got one or two comments. First, your comments on oil pollution, and some of those that were made yesterday, will be extracted from the record just as quickly as Mr. Crites can get them to us and will be submitted separately to our Washington headquarters for a possible transmission to the Subcommittee on Air and Water Pollution Control, U. S. Senate, where they are considering amendments to the Oil Pollution Act of 1924.

This is of immediate concern, and we will extract that right rapidly. I don't have any other comments, except we deeply appreciate your cooperation, and your continued cooperation, your offer of cooperation, and the business of dredging and filling operations is going to require a tremendous amount of additional cooperation, because we are now getting into this business through making recommendations to the Corps of Engineers, and at times, it becomes a rather perfunctory thing.

When you add all of them up on one estuary, it causes serious damage.

Vince, do you have any comments?

MR. VINCENT PATTON: No, I don't believe I do.

MR. THOMAN: Thank you, Senator Hodges. Whom do you wish to call next from the state agencies?

SENATOR HODGES: I know Mr. Parker is here from the Internal Trustees Improvement Fund.

MR. THOMAN: Mr. Parker, if you will come forward, please, sir.

MR. ROBERT C. PARKER: Mr. Chairman, I want to thank you for this opportunity to make a brief statement of mine from the staff of the trustees of the Internal Improvement Fund.

The Trustees Internal Improvement Fund is a state agency. It's one of the oldest state agencies, created in 1854, and for a number of years, it was composed of only five of the seven members of the Cabinet.

But last year, by new legislation, the Secretary of State and the Superintendent of Public Instruction were added to make an entire complete Cabinet, and we function, our staff functions, under the trustees in the handling of all state-owned land.

The primary concern of the trustees is the protection of the public interests as to these trust lands, submerged in character, which are referred to as sovereignty submerged bottoms, including the lake bottoms and all title areas out to the boundaries to the state, which are three miles in the Atlantic and 10.38 miles into the Gulf from the line of marine low water.

The primary concern of the trustees with respect to these lands is to protect the public interests, because they are referred to as trust lands, and although many critical comments have been directed to the trustees in the last several years with respect to certain dredging and filling operations, these were all considered as being authorized by the Legislature in past acts, and if we look at the history of the rights of -- as we go back to 1856, when the Legislature by the Riparian Act of 1856, gave these Riparian owners a right to fill in out to the channel, and the justification for this grant was in order to encourage commercial, that is, construction of facilities for boating and fishing.

And in 1921, the Riparian Act was amended by the Butler Act, which stated that the act of filling out to the channel reflected title. Of course, this was repealed in 1951, and the most recent legislation with respect to the management of submerged bottoms was the Bulkhead Act of 1957, and those members of the Legislature who are familiar with the facts remember that that was designed with an effort to create a statutory authorization for the orderly development of our shorelines.

I think the legislation with respect to handling these submerged bottoms, requiring more strict supervision of the biological aspects, marine biological aspects, by the passage of Chapter 67-393, which has been incorporated into our authorization with respect to the management of the submerged bottoms.

One of the most significant procedural changes, I think, that has occurred in quite a long time is the decision of the Corps to refuse to handle any dredge permits until they have been cleared through our office.

In other words, we represent the state's interests in all of these matters, and we have hopes -- this was put into effect February 1, and we hope that this will improve the Corps' relationship with our office in the handling of dredging and filling permits because of the fact that their dredging permits are the same term as ours, which is three years, and also we are involved in the issuance of permits for navigational channel work throughout the state, and in many cases, we are requiring persons who desire to make channel-dredging operations in front of their property or in order to connect up to offshore channels, requiring them to submit biological studies to determine if the route that they have selected is the most effective route and would minimize the damage that might occur.

The pollution of water, of course, is of prime concern to the trustees. Of course, the same people serve as trustees as do for the Board of Conservation. They just wear another hat, and they look at it from maybe another point of view, but they do have the same objective.

In looking through your act, I was pleased to find that in the Declaration of Policy, it states that nothing in this act should be construed comparing any matter affecting the right of the jurisdiction of the state with respect to the water, including the boundary waters in each state.

And I am, of course, very pleased that the Legislature saw so fit to enact a very effective act this last session, which has created the Florida Pollution Control Commission, which has just implemented it, and I think it's going to be a very fine adjunct to the administration of these waters within our state confines, and I know they are going to be looking to your group for assistance, because you have been in the business a little longer than they have, and you might have some answers to some of the questions that they haven't found out about yet.

MR. THOMAN: Thank you for those kind words, sir, but we don't have all the answers.

MR. PARKER: I don't guess any of us do, but we are looking for them. But I think with the dedication and the conscientious efforts that are being made in this direction by all parties and, of course, the emphasis that is being placed on it, not only by the state and federal agencies, but by the general public, I think that is what is going to accomplish much for us.

I don't think you can properly accomplish an objective of clearing up polluted waters without the effective help of the public, because they are the ones that are going to benefit mostly by it.

I think they are the ones that are going to contribute most to the overall accomplishments in this water pollution problem. We are aware of the fact that the expanding population has created new problems, and the older -- one of the things that I think the State of Florida has been confronted with is the increasing problem of sanitary sewage facilities being inadequate, and they use the old septic tank type of operation throughout a lot of subdivisions, and it's created problems that we are just beginning to recognize.

We don't have anything specific except to say that we are going to offer our full cooperation in the matters coming under our jurisdiction and we intend to administer these new laws that have been enacted to the very best of our ability at staff level, and I know the trustees have that objective in mind.

MR. THOMAN: Thank you very much, Mr. Parker. I have one comment in the nature of a question. What are you doing in controlling dredging and filling permits when they come in such a piecemeal basis that one of them would cause no damage to an estuary and the next one doesn't cause any damage, but after five years, when you have issued 50 permits, the estuary, or that particular body of water is almost destroyed with its particular uses?

We are faced with this, because we are getting these from the Corps, too. The man that is on my staff that is in charge of this is very much concerned about it, because he feels he cannot turn down an individual or recommend disapproval of an individual's request, but when you take all of these and stack them up in terms of four or five or ten years, you end up that you have destroyed an estuary.

MR. PARKER: Well, of course, the trustees do not actually issue a permit. We review them.

MR. THOMAN: You can veto them.

MR. PARKER: Under the new law, we can. We didn't have that authority under the old law. The magnitude and numbers that you're speaking about is where your problem is insofar as the overall damage.

I think that's what you had in mind.

MR. THOMAN: This is what happens, take any specific case, and I'm not that familiar with them -- we had a case in point where an individual had done some dredging and filling in the neighborhood of Sikes Creek, I believe.

MR. PARKER: Yes.

MR. THOMAN: The individual particular thing there did not cause any damage, but when you looked at what permits had been issued over a five- or ten-year period, that particular body of water was completely destroyed.

Now, it seems to me that some more detailed planning might be needed. This bothers us, because we hate to continue to concur in these things when overall it might be causing a problem.

MR. PARKER: Well, actually, the matter of dredging and filling, a lot of your dredging, material is taken out of a recognized channel, which I don't think should be classified as in the category of a pollution problem.

If you don't have channels to run your boats in, the people are going to be deprived of both. I don't think the trustees or any public agency would want to deprive the general public of having boating in any of our estuaries.

So you have got some channel work that is going on regardless of whether there is damage. And actually, it's not a pollution -- your siltation is a problem, and it's temporary, as a matter of fact, when you disturb the bottoms.

When you're talking about polluted water or disturbing the estuary, I don't know which one you have referred to -- when you disturb the bottoms, why, you're, of course, going to disturb some of the marine nursery areas that are involved in fish production.

MR. THOMAN: Well, this is a form of pollution that has altered the environment.

MR. PARKER: You mean the dredging?

MR. THOMAN: Yes. And in some instances, actually, siltation can completely destroy an area. We had a case in the Virgin Islands where some seven or eight miles of beach were completely destroyed by siltation from a dredging operation.

MR. PARKER: Well, I am aware of the fact that there is a certain damage in any disturbance, and whether you're doing channel work -- perhaps some of your worst damage is done by your public projects, but I think it's done and it's justifiable.

But I am speaking about the overall damage that is occurring in an estuary, that is done by channel work, recognized channel work, in which the state and the federal government are involved.

MR. THOMAN: I think the only point I was making was in the future we are going to have to take a much harder look than I think we have in the past and try to develop some recognized alternatives or sense of values for these alternatives --

MR. PARKER: Do you construe that your agency has the jurisdiction on our locally located estuarine areas on pollution?

MR. THOMAN: No, what I'm telling you is the Corps of Engineers' permits do come to us for review and concurrence.

MR. PARKER: Do you have any authority to say Yes or No on it?

MR. THOMAN: They can't approve unilateral dredging or filling permits unless we concur.

MR. PARKER: Of course, the Corps' primary concern up to now has been navigational only.

MR. THOMAN: That's correct.

MR. PARKER: And, of course, they have been involved in other things -- the U. S. Fish and Wildlife Department has gotten into that, too.

MR. THOMAN: Yes, that's correct. Well, we are just belaboring something here.

MR. PARKER: I am trying to give you the overall dialogue we have had with the Corps people.

MR. THOMAN: I think some of our people should get in contact with you so that we will have the same type of dialogue.

MR. PARKER: We have not been in touch with your organization. We are just getting into this thing.

MR. THOMAN: Thank you very much. I would next like to call on John W. Woods from the Florida Game and Fresh Water Fish Commission, Tallahassee, Florida.

MR. JOHN W. WOODS: I am John W. Woods, Chief of the Fisheries Division of the Florida Game and Fresh Water Fish Commission.

I regret that Dr. Frye, our Director, is out of state, and he has asked me to present our statement before this board today.

The Game and Fresh Water Fish Commission appreciates this opportunity to appear before you to express our ideas of estuarine value, use and problems in Florida.

First, we should qualify our statement by explaining our jurisdiction in estuarine areas. This would encompass rails and waterfowl (resident and migratory), shore and wading birds (resident and migratory), fresh water fish and mammals associated with estuarine habitat.

Our work in these areas involves inspection of dredge and fill permits and other public works projects initiated by the U. S. Army Corps of Engineers.

The value of Florida's estuaries for the above-mentioned resources is phenomenal. Waterfowl use is primarily concentrated in areas of expansive grass flats containing ruppia, turtle grass and other species.

This is also the preferred habitat of other bird life that dive for their food, such as pelican, terns, osprey and the bald eagle.

The mud flats and sand flats that are exposed daily with the tides are heavily used as feeding and resting areas by rails, shore and wading birds, as well as raccoons and other animals.

The fresh-water fish species that are associated with estuaries are primarily concentrated among the islands at the mouths of the major rivers of the Gulf Coast.

We feel that the future use of the estuaries in Florida should be to maintain and perpetuate fish and wildlife species for the use and enjoyment of the public.

What practices do we consider destructive of the public use of our estuaries?

1. Unreasonable bulkhead lines extending into the shallow water of the estuaries. Some are as far as 1500 feet from the mean high-water line.

Nearly all bulkhead lines in the state should be pulled into the mean high-water line of the mainland, whether there has been sale of the bottom land or not, and reasonable-sized access channels utilized for navigation to deeper water and to provide fill for upland needs.

2. The dredging and filling associated with bulkhead lines creates high turbidities in surrounding areas and can eliminate grass flats and productive marine bottoms restricting light penetration and coating these areas with silt.

The silt damage, however, does not stop when it first settles as wave action by heavy winds may resuspend it to settle again in other areas.

We consider dredge and fill as the most damaging pollutant to Florida's estuaries, as well as the most permanent destruction of the estuarine habitat.

3. Nutrients from watershed leaching, as well as direct discharge of domestic and industrial effluents through drainage canals are beginning to express their presence in some bays of Florida, such as Hillsborough Bay, North Biscayne Bay, Upper Tampa Bay, Indian River in Brevard County and others.

This enrichment is further aggravated by construction of urban areas, canals and causeways which interrupt the natural currents and tidal exchange which previously flushed these problems into the sea.

Much of this could be avoided by back pumping the drainage canals which contain volumes of fresh water, nutrients and silt into inland marshes, such as the conservation areas that have the capacity to absorb these nutrients.

Back pumping would also stabilize salinities and reduce siltation of the estuarine environment. Bridges crossing estuarine areas should be 90 percent piling and ten percent causeway, instead of vice versa for better tidal movement.

Eutrophication in the estuaries is shading out grass flats and covering desirable marine soils that are necessary for wildlife production.

4. Exotic aquatic weeds have been established in the estuaries of the Homosassa-Crystal River area. The Eurasian water milfoil was apparently introduced by a commercial aquatic plant grower to be used for his aquarium trade.

At the present time, more than 3500 acres of this estuary has been blanketed by this noxious exotic aquatic weed. This is the same plant that recently blanketed over 100,000 acres of the Chesapeake Bay.

To protect our estuaries, we must prevent these unauthorized introductions of aquatic weeds. We must provide research for the control of these undesirable aquatic weeds without damaging the other aquatic life.

5. Although Florida has not experienced great problems from thermal pollution, we are quite concerned with pending problems of this nature.

Thermal pollution is possibly more critical in Florida than in any other state, in that our estuaries and bays are quite warm due to our subtropical climate.

Thermal pollution does stimulate the replacement of sea grasses with algae and in many cases can raise the temperature of the bay above the survival threshold of some aquatic organisms which are valuable as food to shore and wading birds.

We feel that industries and/or municipalities that have the potential to introduce thermal pollution into Florida's estuaries should be required to use the closed system of cooling or purchase enough land to cool all water back to bay temperature prior to its discharge.

With the growing number of boat enthusiasts and barge traffic in Florida, there is a constant demand for navigation channels crossing the estuaries. The channels should be designed to follow the deep-water areas of the bays to reduce dredging as much as possible.

Additional spoil sites should be located by a field inspection of all agencies concerned with major emphasis on preservation of fish and wildlife resources and the aesthetic quality of the estuarine environment.

Beach erosion has placed an additional demand on our estuaries as borrow sites for sand. Since there are dredges capable of dredging offshore for beach nourishment material, no estuary in this state should be used for this purpose.

Florida set the precedent for preservation of its valuable estuaries in 1966, when Estero Bay in Lee County was established as our first offshore preserve.

The bay will be protected for public use in perpetuity. Another preserve was the addition of submerged lands to the John Pennekamp State Park in Monroe County last year.

However, at the present rate of progress, we are moving too slow to get the valuable areas of the state protected before they are destroyed.

We will close with the statement that Florida's estuaries are too valuable to be sold, dredged, filled or polluted any further than they are today, with many in dire need of renovation.

The natural production and "aqua-culture" in these estuaries could feed much of the world and still provide sporting and aesthetic qualities desired by the residents and visitors of the state. Thank you very much.

MR. THOMAN: Thank you very much, Mr. Woods.

MR. WAKEFIELD: I would like to ask if the estuarial bay includes exclusion of the discharge of treated wastes.

MR. WOODS: I'm going to ask Larry Shanks about that.

MR. LARRY SHANKS: No, sir, it does not.

MR. WAKEFIELD: Bill, could you all come up with an evaluation of the benefit of reducing pollution in an estuary?

MR. WOODS: Do you have a procedure to do this?

MR. WAKEFIELD: I think this is the problem, to put a dollar value on this.

MR. WOODS: I think we could, yes.

MR. WAKEFIELD: This is going to be necessary in order to justify spending money for that purpose.

MR. THOMAN: Thank you very much, Mr. Woods.

SENATOR HODGES: Mr. Reed asked me to represent him when he left, but he didn't give me a current list of the ones that were to be here.

MR. THOMAN: At this time, I would like to call on Sidney Berkowitz, Director of the Bureau of Sanitary Engineering, Florida State Board of Health.

Mr. Berkowitz is an eminent engineer and present President of the Water Pollution Control Federation.

MR. SIDNEY A. BERKOWITZ: Thank you, Mr. Thoman. I am here today, and I wear two hats sometimes, as Mr. Thoman has just pointed out, so I don't know which one to speak for first, but let me clear one out.

I am not here officially representing the Federation, but every place I go over the United States, I do represent the Federation.

I want to say that two weeks ago I had the privilege of conferring with my friend Joe Moore, who is a Commissioner of the Federal Water Pollution Control Administration, and the Water Pollution Control Federation is going to continue to serve that Administration in an advisory capacity, and we will be advising the Administration on matters of this type as seen for the best interest of the country.

Having completed that, let me say that sitting here yesterday and even today, I am disturbed at the numerous statements which have been made suggesting that either little or nothing has been done about pollution control in Florida.

The record of over two decades of pollution abatement apparently has not been adequately made known to the people. We hope that the people are now ready to pay for protecting and improving waterways, including estuarine areas.

We hope, also, that the people are prepared to accept professional judgments. The enforcement of laws is not accomplished solely on the basis of conjecture or rules and regulations.

It is necessary that legal enforcement be accompanied by facts -- facts based on scientific studies and findings. We are pleased to note that after many years of preaching by the Bureau of Sanitary Engineering of the State Board of Health -- our preachings are now being supported by many others.

Perhaps with our numbers increased, we can achieve the goal, which is to increase our present average effective treatment from 70 percent to over 90 percent.

We have possibly had the highest average overall efficiency of waste treatment of any state, certainly in the southeast.

But I feel certain this average of over 70 percent, when the national average is something under 50 percent or approaching 50 percent, does suggest what this state has done.

We have neither been satisfied nor complacent, but we have often been limited by available resources. The future always looks bright to an optimist, and the support evidenced here suggests to me that we are going to move forward even more rapidly, but I hope that no one here, or no one who will read the hearing testimony, will assume that nothing has been done in the State of Florida over all these years.

We didn't just start yesterday. We recognize the support that has been given, but the people of the State of Florida, as Senator Johnson said yesterday, feel that they can take care of their own with all of the proper and appropriate support from the federal government.

But I suggest that local interests not forget their responsibility. We do have a need to establish an on-going, and increasingly more important enforcement program.

It may not be well publicized, but while the Air and Water Pollution Control Commission was established by the legislative act of last year, the Bureau of Sanitary Engineering, under the rules of that Commission, has been charged with enforcing the rules and regulations, and it is interesting to note that we have been maligned or pushed both ways.

We have been criticized for enforcing and we have been criticized for lack of enforcement. We could cite instances too numerous to bring to the hearing record at this time, but again, we are pleased, and I am particularly pleased, as a new Bureau Director, with an extremely competent staff to note the very valuable support which has been mentioned here.

I hope that as we travel around, as we move forward in enforcing the rules and regulations of the Water Control Commission, that we get that support at the local level, too.

Now, I have a presentation, which I will submit a copy to the record. It is entitled "The Value of Sanitary Districts in Maintaining Quality of Estuarine Waters."

The district or authority -- we would use the words interchangeably -- district or authority has been used in some areas and has been used in Florida to a limited extent.

Maintaining the quality of the estuarine waters of the State of Florida in compliance with Florida's Water Quality Standards will be a challenge to the people of Florida. This challenge can and shall be met.

The challenge comes about since a major portion of the present and future population of Florida will abut our coastal areas, thereby jeopardizing our estuarine waters.

In this area, all the problems of pollution must be met and solved -- industrial, commercial, sewage effluents, storm run-off, dredge and fill problems, industrial cooling waters and watercraft waste.

These waters must serve many interests, such as for recreational purposes, the needs of conservationists, commercial, and sports fishing, along with commercial shellfish harvesting.

It must always be remembered that the second-largest industry in Florida is that of the tourist industry, which, at present, amounts to over four billion dollars per year.

The majority of our tourists come to our beautiful state to enjoy water-related activities.

Criticism has been directed at the federal government for taking too active a part in pollution abatement. Likewise, state governments have been criticized for not taking a sufficiently active role.

The truth of the matter is, the reason the federal and state governments have now moved in on the pollution abatement picture is because state and local governments have failed to meet these problems locally.

In this respect, it is our opinion that to maintain and enhance the quality of the waters in Florida's estuaries, the creation of sanitary districts or authorities may be a most important device.

By sanitary districts, we mean that local governments, not necessarily related to municipal or county boundaries, should be created with legal authority to consolidate all waste-water collection, treatment and disposal. This concept definitely includes both domestic and industrial waste water.

This consolidation should also apply to the solid waste problem -- garbage, trash, abandoned cars and appliances. Furthermore, while some may misunderstand that it has anything to do with pollution, the districts should consolidate the public water supply systems.

The first defense in producing quality drinking water is to protect the raw water, surface or ground, from pollution.

By consolidating and placing in the hands of professionals these important activities of mankind, state-level surveillance of their operation and quality of effluents and receiving waters can be made with greater accuracy and at less cost in taxes to the citizens.

To illustrate the necessity of creating sanitary districts with proper comprehensive and long-range planning, we shall refer to the "Lemon Bay Case" in Sarasota and Charlotte Counties.

Lemon Bay was recently classified by the State of Florida as Class II waters, which, essentially, means the quality of those waters shall meet recognized standards for commercial shellfish harvesting.

Recently, a proposed development on the shoreline of this estuary was presented to the Bureau of Sanitary Engineering.

Our agency, in writing, explained to the local government and the developer that Lemon Bay would be closed to commercial shellfish harvesting if any sewage-treatment plant effluents, regardless of quality, were discharged into this body of water.

As a result of this, it was suggested that these waters be reclassified to Class III, or as recreational waters. Immediately a storm of protest arose from well-intentioned conservation interests saying that this was essentially degrading the waters.

Fortunately, the citizens in this area are in favor of creating an areawide sanitary sewer district. Our agency has always promoted such districts, and, in this case, we compliment the citizens living in the Lemon Bay area for their forthright stand regarding the need for a consolidated sanitary sewerage district.

Fundamentally, the day of the single, small sewerage system is past, not only in the metropolitan areas of Florida, but in the potential metropolitan areas.

The cost of land and the elaborate treatment works required to comply with Florida's Water Quality Standards compel every citizen to realize that we must create sanitary districts to protect and enhance our estuarine waters, as well as all the waters of the State of Florida.

There is an old adage that applies most appropriately to many aspects of life: "Don't put all of your eggs in one basket."

This adage must be rewritten: "Do put all of your environmental engineering eggs in one basket -- the sanitary district basket." Thank you.

SENATOR HODGES: Sid, you mentioned something about your recommendation on motorboats. At this time, could you give an estimate of when your recommendation will be made to the Control Commission and when they will act on it?

MR. BERKOWITZ: Senator, I don't know how rapidly we can get it. We have some rules and regulations -- let me say, this applies to only those vessels on the waters of Florida which have onboard marine toilets.

This does not apply to the outboard that does not have a toilet. This has been a misconstruction of what we have been talking about. We are talking about all the boats that do apply that do have onboard facilities, and the rules and regulations, I would hope, would be in a form which we could present to the Commission for its study, and then an eventual hearing and the necessary attention after that -- perhaps in the next 60 to 90 days.

Now, if it were presented at that time -- may I answer an unasked question? I would recommend that there be a two-year limitation on the time that it would become effective.

I don't think it could be done much more rapidly than that. Although we have some marinas that are equipped to service such boats, but all the marinas are not so equipped, so there would be a time lag, I would think, of two years.

The federal legislation may, in fact, come before that. There is presently a bill in the House by Representative Fascell, which proposes certain action.

I have a copy of that on my desk, too.

MR. PATTON: One comment I might make on that, Randolph, and you probably know this, but for those who don't, any hearing by the Commission will require an advertisement, a 30-day waiting period before the hearing is held with public notice in the newspapers and to the affecced parties.

This is further extension as compared to some of the previous laws where you could put it in one newspaper and this was considered sufficient notice.

So I think all those people, both owners, who would be affected, the Boating Council, or anyone of this nature, will certainly be notified before any such hearing is held before the Commission or examiner for the Commission.

Well, if this is a rule, then they would have to be before four members of the Commission, so there certainly will be full notice.

One other thing I would like to say is that I am glad that Sid brought out the "Lemon Bay Case." I think that several people in Lemon Bay must have had their typewriters warmed up before the Commission announced my appointment on the 2nd of February.

I believe that there must have been a simultaneous action, for all the typewriters were immediately put in action and the letters started being written.

I have quite a stack. I am working my way down. I know I wrote Representative Tillman, asking him to pass the word on that I am not ignoring these people.

They will be answered as soon as I get to them.

MR. WAKEFIELD: Sid, I would like to first say that I fully agree with you on the need for district management. But I am wondering if a Water Quality Control District is not indicated rather than a Sanitary Sewage District, with the idea that they would also have control of sources of pollution that don't necessarily come out of pipes and come from the normal treatment plant efforts.

MR. BERKOWITZ: To answer your question, as a long-time associate of years back and long-time friend, I would say No.

If we are talking about enforcement, it is still my feeling that since political boundaries don't stop pollution, neither would the boundaries of an authority or a district stop pollution, so there needs to be concerted control from state level.

Now, so far as extending the activities of the authority, I have said in here it should extend to all types of pollutants.

MR. WAKEFIELD: This is what I'm getting at.

MR. JENSEN: You have pointed to the need for areawide planning for pollution control. One of the previous speakers talked about dredge and fill operations, though, and how these had to be handled on a bits-and-pieces approach.

Would it be possible or feasible to have areawide planning for dredge and fill?

MR. BERKOWITZ: I would always say there is an opportunity for areawide planning for any matter, whether it's highways, roads, dredge and fills and waterway usages or what.

In riding down the coast some month and a half ago and looking at some of the estuarine resources with Mr. Reed, who is not here, and some gentlemen from the Corps of Engineers, the question of the length of our shoreline happened to come up, and we have always talked about anywhere from 8000 to 9000 miles of shoreline.

The gentlemen from the Corps of Engineers indicated their measurements bring out something like closer to 20,000 miles of waterfront. This is not all coastline.

Part of this has been developed by dredge and fill operations that made land usable for housing, for home use, for other purposes, which would have remained in the estuarine-vintage type of usage.

Of course, everybody who moves to Florida, I assume they would like to have a boat at their back door. So we have canals dug, and this type of thing, where total planning is necessary, and I don't know how to achieve it.

We have already passed the point of no return in some areas, and many speakers have spoken of this, but this is one of the things that our Bureau, for over two decades, has been preaching.

Again, I say, we are glad to have people join us in this.

MR. THOMAN: Senator.

SENATOR HODGES: Mr. Chairman, on the risk of being out of order as Chairman of the Florida Boating Council, I would like to say, Mr. Patton, there are many typewriters that are already warmed up for the subject of pollution for motorboats.

There are many boatowners that feel when we talk about a little bit of pollution caused by motorboats in comparison of the millions of gallons of raw sewage dumped in our estuaries and rivers by the cities, that we are straining at a gnat.

I don't think we are quite ready for that.

MR. PATTON: Senator, you may be aware that there have been some pieces of paper issued to those cities that you have referred to.

MR. THOMAN: Thank you, Sid. I would next like to introduce State Representative Jack Poorbaugh from Palm Beach County, Boynton Beach, Florida.

REPRESENTATIVE JACK POORBAUGH: Mr. Chairman, honored guests, ladies and gentlemen: I wish to call your attention to a phase of water pollution in depth that has already been mentioned that is affecting the estuaries of this state with increased rapidity.

The number of pleasure boats in Palm Beach County alone has increased from 7000 to 8000 in the last two years. Of this total number of boats, it is estimated that less than one percent is equipped with sewage-treatment devices.

The other 99 percent are discharging raw sewage into the water that they travel. The problem has grown so acute in certain areas, that Florida must soon take steps to make certain that marine toilets are equipped with either holding tanks or treatment devices.

There are four types of devices presently available. I will name them in the degree of most common usage: one, the first type is the macerator-chemical treatment, including chlorinators; two, the second type would be the retention system, such as holding tanks; three, the third type would be a recirculating system, with or without holding tanks; and fourth, the incinerator type.

The cost of these devices I have mentioned range from $150 for the least expensive chlorinator to $1000 for an incinerator. Holding tanks, of course, need dockside pumping stations connected to local sewer systems, and in the past, marine owners have been reluctant to install such facilities.

However, when boats would be equipped with holding tanks, it would make such an operation profitable to the marina owner.

In addition to pleasure boats, action should be taken that would also apply to all commercial vessels traveling these same waters. Florida, perhaps, more than most states, has a great number of pleasure boats from out of state.

This would require interstate cooperation for a sound solution. In conclusion, the opportunity to appear before such a forum is greatly appreciated, as well as the forum itself.

However, I believe the State Legislature, with the help of our Governor, can successfully solve this particular phase of water pollution within our own state government.

SENATOR HODGES: I think that Mr. Patrick will be presenting the statement prepared by Mr. G. E. Dail, Jr., Executive Director of the Central and Southern Florida Flood Control District.

MR. BOB PATRICK: The interactions between water management agencies, such as the district, and estuaries largely center in the fresh-water input to the estuaries.

Problems arise from both the quantity and quality aspects of this input as variations are introduced into the system. Modern man inevitably introduces variations, and nature, just as inevitably, moves to achieve a new balance.

Unfortunately, man does not always anticipate or appreciate the resulting environmental changes. The principal point lies in the fact that the entire problem revolves around man's choices and desires.

In terms of the total system in southern Florida, some understanding may be gained by a short review of the basic topographic and climatologic factors and the course of man's development of the area.

The climate of the area tends strongly to a wet season-dry season regime. The intensity of the extremes varies from year to year, largely dependent on wet season rainfall and the incidence of hurricanes and other tropical storms.

The topography of the area is quite flat and characterized by swamps, ponds, sloughs, lakes and relatively few well-developed streams. The primeval system was characterized by storage of a major amount of the wet season supply and a recession in the following dry season.

The high-water table and corresponding large surface water areas encouraged a high evapo-transpiration rate. Consequently, a major share of the annual supply was depleted in this manner.

The discharges to the coastal areas were relatively high during the wet season with peaks following major storm events. The poorly developed surface drainage tended to elongate the recessions, giving a relatively stable gradually receding water supply to the coast during the dry season.

Man's development efforts, for more than half a century, were bent almost exclusively to drainage. In terms of water supply, these drainage efforts effectively reduced the storage capacity of the system and have cumulatively resulted in larger flows during the wet season and have consequently reduced flows during the dry season.

At the time of the district's establishment in 1949, it had become generally recognized that the overall problem could not be solved by additional drainage alone, but that conservation of water for the following dry season was a necessary adjunct.

Consequently, the project, while still basically oriented to a flood-control concept, had designed into it rather major water conservation features.

The current investigation by the Corps of Engineers of the overall water supply of southeastern Florida has highlighted the need and justification for much more extensive water conservation features.

As water conservation features develop and become effective, the net result will be a reduction of flows to the coast. In fact, during the dry season, anything above a very minimum flow in most cases would have to be released by intent.

Since water supply is going to be insufficient to meet demands in the foreseeable future, this brings up the very knotty problem of allocations.

The quality aspects of the inflows to tidewater have undergone changes, as well. Land clearing and the practices of agriculture have increased the silt loading considerably.

There has been a continuing increase in the nutrient load. Pesticides and other exotics have entered the system, as well as the all-too-familiar urban pollutants.

There are a number of conclusions that may be drawn from this state of affairs. One of the primary ones is that basic irreversible changes have taken place and will continue to take place in the overall system and consequently there can be no thought of returning to the primeval state.

There are certain things that can be done to alter the course of events if sufficient knowledge exists to allow projection of the results of any given set of actions.

Insofar as water management agencies are concerned, this largely has to be in the area of controlling the inputs to the estuaries in terms of the rate and time distribution of discharges.

In the area served by the Central and Southern Florida Flood Control District, the Corps of Engineers and the district have faced the problem of excessive wet season flows in the design of almost every major coastal outlet.

The district expects to see requests for dry season flow augmentation for the benefit of estuaries in the future. There is an obvious answer to both of these problems in the replacement of the lost system storage.

The flat topography of the region makes the creation of artifical storage a difficult and expensive proposition. It requires rather extensive areas for storage in any case.

The risks involved and the economic costs increase rapidly with storage depth. Also to be considered are the costs of transporting water to and from the storage facilities under the required low head conditions.

Consequently, the amount of storage provided is a function of the value attached to the stored water balanced against the costs of providing and operating the system.

Allocations should then be made in the light of system capacity and overall demands. As water becomes relatively more valuable, the justification of further storage and transport facilities becomes apparent.

However, it should be recognized that this process is subject to the law of diminishing returns and to an ultimate limit of possible supply.

This discussion has necessarily reached rather far afield from the assigned topic of estuarine pollution.

From the point of view of the district, the demands for this purpose are only one group out of an entire spectrum of socioeconomic demands, and must be viewed in its proper perspective in this overall problem.

The district and the project has been rapidly changing from a single-purpose flood-control concept to an overall water management viewpoint as the need has appeared.

There has developed a great need for an accepted methodology for distributing scarce resources and fixing the level of economic goods that can be either expended or foregone in favor of nonmarket demands.

In other words, a realistic and rational method of allocation of a limited water supply in the face of unlimited and competitive demands. Thank you, gentlemen.

MR. THOMAN: Thank you very much, Mr. Patrick.

SENATOR HODGES: Next on my list is the Outdoor Recreation Council. I don't know if there is anyone representing them or not. Apparently they are not here. That's all I have.

This is an old list that I have.

MR. THOMAN: Are there any other state agencies who wish to make a statement at this time? If not, I would next like to call on Mr. McLouth, Canaveral Port Authority, Cape Canaveral, Florida.

MR. M. E. McLOUTH: I work with Pan American World Airways at Cape Kennedy. I am involved in air and water pollution problems there. I also serve as Port Commissioner at Port Canaveral and Vice-Chairman of the Environmental Control Committee in Brevard County.

The specific water pollution problem as exists today in Florida has been the subject of several speakers. Thus, I will direct my comments to predictions of future trends and effective management programs and/or solutions that might be applicable.

I think, as far as future trends, the most important thing we have in Florida is the population explosion. Figures from 1960 to 1965, show a three-percent increase.

In this particular area, in the east-central Florida area, they expect in the next 15 years to double their population, which is pretty spectacular.

Therefore, since population is a direct function of pollution, whether it be water or air, we must expect to increase the efficiency of our controls by at least seven percent per year.

Now, that's really something pretty significant. If we don't, things are going to get worse. I actually predict that things will get worse before they get better.

Certainly, in east-central Florida, we are not moving ahead fast enough. Unfortunately, these water pollution problems are completely complex and, as you have heard several speakers describe, many of the complex aspects to various water pollution problems, the number of variables involved, is terrific.

You have heard about sewage disposal problems, but when we are talking about some of the other little problems, such as increased surface areas, such as streets and roofs that increase the run-offs.

They pick up pollutants, and air pollutants fall on these surfaces, and they are directed into our estuaries.

Well, with this variety of problems, we also, as far as population expansion, we also must look to industrial expansion and we see the tourist industry in the Disney area, and this particular Orange County area, and we find that this is going to be bringing many, many people to this area that will increase our problem.

Then, of course, the oceanographic expansion of the entire State of Florida will also bring many numerous industrial-type problems.

Well, I think the one answer is the use of management techniques developed by our aerospace firms to aid state and federal officials to cope with these complex environmental problems.

We must move forward in many areas similar to what we have done on the space program. We have got to develop new disposal methods, re-use of existing water supply desalination, and certainly, legislation.

These are just a few of the areas. We now have found that aerospace techniques have been used in California to some extent. However, I think that the various governments must seek out the aid of the private sector of our economy to solve these challenging problems with as much enthusiasm as they do to seek aid in solving national defense problems.

A second step is to establish standards now, and fortunately, the government is moving in this direction, and we also must establish measurement programs to let us know where the trends are.

I think something here that is worth mentioning is, we really do a disservice to industry if we are tracking industry or population if we don't let them know that we want to maintain a good clean environment.

It's like your wife, when you purchase a home, if she decides later on that she wants a third or fourth bedroom, well, you know the financing problems. It's very difficult to perhaps put that fourth bedroom on.

On the other hand, if, bringing this back to industry, if you let them know that they need pollution control equipment before they come in, they can set their financing program to allow for this to occur.

We had a recent example in Port Canaveral. We are very interested in Port Canaveral in developing a scallop industry. Perhaps you have heard about the scallops off the coast of Florida.

Well, we would like to see this industry develop. On the other hand, we are very concerned over the fact that a couple of weeks ago we had a firm with a concrete proposal to develop the scallop beds off our coast.

However, he proposed dumping all this raw sewage directly into our port waters, and we turned him down flat.

I think that we all have to recognize that, and I think we did him a service, because we would have been forced to do just what we did two weeks ago, because, in two years, it would have destroyed the waters of the port, and the public wouldn't have stood for it.

We have other problems in these various ports. Certainly, oil pollution is one, and I was happy to see that the Governor's office is taking some action in encouraging ports to be equipped to handle these problems.

Frankly, we are not equipped in Port Canaveral -- if we have a major spill, we have a major problem, and I would venture to say that this is true in about 99 percent of all ports in the United States.

Well, certainly, we have all heard that pollution knows no political boundaries and thus these standards must be set on state and, certainly, on even federal levels, because interstate problems do crop up.

So really, the scale of the problem probably limits the development of the standard itself. I think national standards are going to be extremely useful in the state, particularly in the east coast, and particularly, the State of Florida will be involved in these interstate problems.

Well, lastly, I would like to throw out what I think is a solution, as far as a long-range solution to this, and I think this is something we might work toward, and that is the use of man's waste products, both solid and liquid, and perhaps even air, to fertilize the ocean.

We are all aware of the food problems that we have. Perhaps we could solve two international problems at the same time. The use of sewage and solid waste products properly treated to fertilize the nutrient to produce food involved in fish farming.

I think this is an area that is an example where enlightened aerospace techniques of the private sector of the economy could develop these techniques to come up with something useful in this sense.

In conclusion, the technology necessary to solve our water pollution problems is available today. We only need the desire to apply this knowledge. Time is short and we must act quickly and decisively even to keep on an even par.

We must think big, because the problem is big. Thank you.

MR. THOMAN: Thank you very much, Mr. McLouth. Any questions, gentlemen? I guess there are no questions.

I would next like to call on Vernon E. Keys, Director of the Bureau of Sanitary Engineering, Florida State Board of Health, Mr. Keys.

MR. VERNON E. KEYS: Mr. Chairman, ladies and gentlemen: I have a small presentation to make concerning the shellfish production in the State of Florida, which I am vitally concerned about.

The figures that I will quote are from the Fish and Wildlife Services Marketing Division in cooperation with the Florida Board of Conservation.

During the year 1967, a total of 4,754,180 pounds of oyster meats were reported as being landed in the State of Florida. Of these reported landings, 4,147,694 pounds, or 87-plus percent, came from the Apalachicola Bay area of Wakulla, Franklin and Gulf Counties.

From a production standpoint, only three areas or counties reported in excess of 50,000 pounds. These were Brevard County with 89,506 pounds, or 1.8 percent; Levy County with 74,089 pounds, or 1.5 percent; and Bay County with 59,705 pounds, or 1.2 percent of the state total oyster production.

The remainder, or approximately nine percent (483,186 pounds) was reported from 15 counties as follows: Santa Rosa, 46,195; St. Johns, 35,562; Duval, 32,051; Wakulla, 27,678; Citrus, 16,234; Escambia, 13,538; Volusia, 12,629; Lee, 12,128; Indian River, 7603; Walton, 6634; Dixie, 2376; Charlotte, 1934; Pinellas, 1512; Sarasota, 1130; St. Lucie, 650.

I am sure that each individual has his own opinion as to what constitutes pollution to estuarine areas; however, my comments will be confined to pollution as it affects the shellfish-growing areas in Florida.

The bacteriological criteria or water quality for oyster-growing waters, that is, harvesting for direct human consumption, is quite stringent.

This criteria is a median coliform content of 70 MPN per 100/ml, as established by the National Shellfish Sanitation Program, which is a cooperative program between the shellfish industry, state regulatory agency and the Public Health Service.

This is water of extremely high quality, and the water quality in any estuary is subject to change, depending upon rainfall, surface run-off, high tides and sewage-treatment plant failure or malfunctioning, either in the plant itself or at lift or pumping stations.

Inasmuch as oysters are estuarine, rather than truly marine in nature, their habitat is in tidal areas or flats, and these are the areas most desirable for man to build communities, factories, marinas, fish camps; in short, man urbanizes these tidal areas.

It has often been said that people and oyster-growing areas are not compatible; however, if man is willing to expend vast sums of money, the area of noncompatibility can be decreased.

There are many areas in Florida, as well as other states, that cannot meet the minimal standards for a shellfish-harvesting area; and most, if not all, of these areas will never meet these standards due to variables that cannot be controlled by any agency, state or federal.

Cloudbursts, surface run-off, power failures, floods and the like are not controllable; therefore, safe buffer zones must be established to insure safe water quality in shellfish-harvesting areas under the most unfavorable hydrological and climatological conditions.

Nutrients, normally speaking, will not affect oysters due to the natural tidal change of water in a suitable shellfish-growing area. Oysters cannot tolerate drastic changes for prolonged periods of time.

Increased salinity or lack of salinity, extreme heat or cold, excessive silting, predators and shefting bottoms are always a possibility. All fishes, fin as well as shell, are dependent upon some nutrients for survival and growth.

There are many areas in the state that are suitable for oyster culture, which are not utilized. Some of these areas are not suitable for oyster spat to set; however, seed oysters from other areas could be planted and cultivated.

In the overall consideration or priority used for estuarine areas, the following should be considered:

1. What resource in any given area has the greatest value to the greatest number of people?

2. All factors should be considered prior to this greatest value being determined. Future expansion and zoning should be prime factors.

3. If the final determination or priority is for shellfish production, a management or park system should be established and all concerned cities, counties, boats and individuals informed that the area is for shellfish harvesting, and wastes, in any form, will not be discharged into the area.

Thank you.

MR. THOMAN: Thank you very much, Mr. Keys. Are there any questions? If not, I would next like to call on Mr. George H. Kear, Assistant Chief Mechanical Engineer of the Florida Power Corporation.

MR. GEORGE H. KEAR: Florida Power Corporation appreciates the opportunity to present its opinion on the subject of use and development of estuarine resources.

We understand that the public hearing today is required as part of a study which will result in a report to Congress, giving an analysis of the important uses of estuaries and recommendations for a program for their preservation, use and development.

We feel that in the case of vital state assets such as our public waters, all of the uses must be considered, which include the practical needs of industry, as well as the more aesthetic aspects related to recreational uses. We are concerned with both.

By virtue of the location of its service area and its facilities on the west coast of Florida, Florida Power Corporation has a definite interest in the best usage of estuarine waters.

The bays and coastal waters of Florida, and particularly in the Tampa Bay section and the coastal islands, are a most important economic and aesthetic asset.

The maritime location of Pinellas County, with Boca Ciega Bay on one side and Tampa Bay on the other, makes the condition, both now and in the future, of these waters important to our company.

The great benefits of the estuarine waters as recreational and tourist attractions accrue to our company directly, as the visitor and permanent population of our service area increases and the usage of electric power increases.

We are most interested to insure, for our company's well-being, as well as that of the communities we serve, that our estuarine waters remain clean and unpolluted.

One important point which we feel should be made in discussing use of estuarine waters is the complete dependence in Florida on the use of these waters in the generation of electric power.

We feel it is important for the public to understand this dependence and the need of our electric generation stations to utilize estuarine waters for cooling purposes in our power plants.

The process of generating electricity by thermal stations (steam power) inherently results in having to remove unusable low-level heat by cooling it with large volumes of water.

This water is pumped through the condensers and is warmed slightly. There is no other practical method of doing this cooling, nor has there ever been any problem resulting from this usage.

For example, in the Tampa Bay area, Florida Power Corporation has operated its Bayboro Station in St. Petersburg for over 40 years, taking in the Bayboro Harbor water and returning it slightly warmer.

Similarly, our A. W. Higgins Plant at the extreme north end of Tampa Bay has operated since the early 1950s, and our P. L. Bartow Station at Weedons Island, since the late 1950s, all using bay water as the cooling medium.

We have, through the years, scrupulously guarded against introducing or permitting accidental introduction of any pollutants into the waters at our power plants and believe that we have an excellent record in this respect.

However, we wish to make it clear that, as an electric public utility, we do use, and must continue to use, bay waters for this purpose -- or not generate electricity.

At the present time, there is much national attention being given to the matter of socalled thermal pollution; much theorizing and conjecturing has been done on possible bad effects, and research is under way, but the concrete results will take time.

We believe it is important that the proven experience of electric operating companies be considered and to date, to our knowledge, there has been no unfavorable consequences from the many years of operation of our power stations using cooling waters from the bays and coastal inlets.

With respect to the role of government in estuarine management and development, we feel that basically this is a State of Florida responsibility, the same as any other waters in the state.

The state's existing agencies can best see to it that the estuarine waters are protected, developed and continue to serve the varied needs of the people of this state.

State water quality standards have been developed, and state agencies are experienced and competent in the matter of insuring against pollution. We see the federal role most useful in the area of research and studies and in assisting the state when requested for special technical assistance.

We again express our appreciation for this opportunity, as one of the major users of estuarine waters, to express our position and opinions. Thank you very much.

We would request that this statement be made a part of the record.

MR. THOMAN: Mr. Kear, it will be made a part of the record.

I would next like to call on Mr. Carl C. Radder, St. Petersburg Audubon Society, St. Petersburg, Florida.

MR. CARL C. RADDER: Mr. Chairman, ladies and gentlemen: I am Carl C. Radder from St. Petersburg. I am Past President and now General Conservation Chairman of the St. Petersburg Audubon Society, also Vice-President of the Florida Audubon Society and a member of the Florida Audubon Society conservation Action Committee.

I appreciate this opportunity to present first a few statewide clean water generalities, and, secondly, to outline briefly four pollution problems of St. Petersburg and Pinellas County, as seen by sanitary engineers of Pinellas County Health Board.

One, statewide generalities: Whether it's worthwhile to say this or not, I understand that the Power and Light Corporation, the phosphate and other industries are making some clean water contributions, but I believe they are too little and too late.

And don't let the phosphate industry say their plants are located so far from estuaries that they are not estuarine pollutants.

And what shall I say about the biocide and fertilizer run-off from agricultural groups, including the citrus industry, vegetable growers and others?

Someone, I fear, will have to drop a bomb on these groups to wake them up to the realization that they have no right to poison and pollute Florida's estuaries. And I'd like to help drop that bomb!

Then there was that silly remark of the tanker representative that said they can't prevent oil spillage!

Now, I understand that clean water will cost money from now on and the cost should be distributed as equitably as possible under a government like our American form of democracy.

But the longer we wait, the more it will cost -- in some cases, running into billions of dollars. I know this from my experience in attending the federal, state and local water pollution meetings in the last several years.

Two, four clean water problems of St. Petersburg and Pinellas County: One, the sanitary engineers of Pinellas County Health Department, which will be the enforcement arm under the recently created Florida Pollution Control Commission, believe the dredge and fill operations of developers are our greatest clean water problem and that this danger will become greater as the population of the country increases.

Of course, Pinellas is now one of the smallest Florida counties with population density among the highest.

We know that dredge and fill operations in Boca Ciega Bay have already destroyed much of the submerged fish, other marine life and dependent wildlife in this area, which, of course, affects also Tampa Bay and the neighboring Gulf of Mexico.

Whether the marine and wildlife assets of this area can ever be brought back to normal is a moot question. Our sanitary engineers believe that the present Class II classification, Shellfish Waters, is unrealistic and should be downgraded to Class III, Recreational Purposes waters.

We believe that great effort should be made to reach the Class II classification, if not in five years, then in ten years.

On the east side of Pinellas in Tampa Bay are hundreds of acres of submerged lands owned by individuals and groups of individuals which will face the problems of development in the future.

We believe that strict development control is necessary to prevent the destruction of one of our greatest natural assets in this area of Tampa Bay.

Fortunately, stricter legislation has recently been passed and the recently created Pollution Control Commission should strengthen enforcement.

Two, septic tanks and lack of adequate sewage treatment is also a problem in Pinellas, as elsewhere, perhaps increased by the numerous many municipalities in which the people do want to tax themselves to pay for clean water.

In the City of St. Petersburg are three secondary sewage-treatment plants and a fourth in the northwest section is under construction. The last named will aid in treating the sewage being poured daily into Boca Ciega Bay, millions of gallons in this densely populated area.

On the Holiday Isles side of the Bay is one primary treatment plant in Madeira Beach. The oysters of the area are now banned by the Health Department as dangerously polluted, and these waters formerly teemed with clams, blue crabs, stone crabs, shrimp and many species of sport and commercial fish.

Three, there is discussion of converting Old Tampa Bay north of Courtney Campbell Causeway into a fresh-water lake. I do not know of a biological or related marine study adequate to determine what changes would occur should this change be made.

Some of the influencing factors would be a complete change of biota, probably increased nutrient effects, temperature changes, and sewage plant effluents.

We have had other small bays converted to fresh water which show problems of weed control, excess algae, and other undesirable conditions. Blind mosquitos, undesirable pests, thrive in shallow fresh-water lakes with high nutrient value.

Should they infest a lake of this size, the control would be nearly impossible.

Four, as an enforcement arm of Florida's Pollution Control Commission, Pinellas County is increasing laboratory space, equipment and personnel. All of those will have to be greatly increased during the years to come if the Health Department is to be able adequately to monitor water conditions and conduct water research.

This will cost money, but as I said before, the longer we wait, the more it will cost.

In conclusion, gentlemen, the Audubon Societies and their many conservation friends believe that American industry, agriculture, municipalities and other government agencies have the necessary skill -- have the will -- to research clean water problems, hold pollution problems where they are now, and make impressive gains, not in the interest of the fish, birds or fiddler crabs, as some have said, humorously, I hope, but in the interest of man himself, who may himself become an endangered species like the bald eagles and Everglades kites of Florida, unless he has the skill and the will to learn to live with his environment instead of carelessly, selfishly and ignorantly destroying the natural assets which Providence created for his use and enjoyment.

These are the beliefs, also, of the sanitary engineers of Pinellas County Health Board expressed to me in different words during the past week. They applaud the efforts which are being made in Florida under the Clean Water Restoration Act of 1966, and they applaud the federal officials for their intelligent approach to Florida pollution problems.

Thank you, gentlemen, for the opportunity to express these remarks.

MR. THOMAN: Thank you very much, Mr. Radder. We appreciate your being here today.

I would next like to call on Dr. David Woodbridge, Director of Research of the Florida Institute of Technology, Melbourne, Florida.

DR. DAVID D. WOODBRIDGE: Thank you, Mr. Thoman. We have heard a lot of words here today concerned with pollution. A lot of people are concerned about it.

To be for clean water has gotten to be the same as to be for motherhood. Yet, exactly what is pollution? We haven't defined it. What are we talking about?

It is not something that we can legislate against because it exists, and thus we must be able to define the terms that we are discussing.

Now, we have talked about thermal pollution, and in the next breath we will talk about chemical pollution, and the next person will come along and talk about bacterial pollution.

A few people have discussed what we could term as botanical pollution. Each of these are different. They are from different causes; they have different effects, and they must be handled differently.

It isn't a single problem. It is a combination of problems. What is the effect of each of these various types of pollution?

It is very obvious that the thermal pollution is not understood. One group of people have stood before this microphone and told you how they thought thermal pollution was going to be harmful.

Another group of people have gotten up here and expounded on how there is a benefit from an increase in the thermal conditions. We do not have the data to substantiate the effects of thermal pollution.

All right. Let's turn our attention to chemical pollution. We know that certain chemical additives to our estuary waters have definite effects upon shellfish, upon fishing, upon sports, upon the coloration of the water, human usage of it.

Some of these are adverse to certain degrees, others are adverse to other degrees. The exact effect is still not completely understood.

The bacteriological pollution is a field that has been investigated perhaps to a slightly larger extent. We have set up, as Mr. Keys mentioned, some rather strict standards as to the amount of bacteriological pollution permitted in waters for shellfishing.

He did forget to mention that he was talking about bacteriological pollution, not pollution in general.

We have actually had areas that are closed under certain conditions, other areas that are opened, based upon the number of what we call either fecal coliform or ecoli count in the water.

We know that certain areas are very undesirable for sports, because of the bacteriological pollution. The waters that can be used for human consumption are limited by bacteriological pollution.

What about the botanical pollution or weeds? These effects are obvious to those who live in areas that are affected by this addition to our waters.

For sporting, it is natural that they present great problems. They also make the water undesirable for usage as far as human beings are concerned.

There is a type of weed that is very prevalent at times along the Indian River along the eastern coast of Florida that will emit a gas that can completely remove the paint from a structure, so this has a very detrimental effect to society.

Another aspect that has been brought into this meeting has been what I would like to say, the orographic changes that we wish to put into our estuary waters.

Where silt could be called a pollutant to the waters, there are other effects that may be more important as far as orographic changes are concerned than the actual pollutant itself, because the circulation conditions in any estuary are based upon what are called the equilibrium conditions.

The equilibrium conditions are set up by the existence of pressure gradients, of thermal gradients and of density gradients within the estuaries.

When man puts in bulkheads because of waste or other orographic changes, he then changes conditions, changes the pressure pattern, pressure grading conditions, the thermal conditions, the density conditions.

This, then, completely alters the flow conditions within the estuaries. So these structural changes are important to the flow. Incidentally, the question was asked yesterday as to whether it was possible to derive theoretical models for an estuary and the effect of these structures.

Today, with the help of computers, it is, because one can set up mathematical models of existing pressure conditions, gradients, of existing temperature gradients, of existing density gradients, and then you can play ennumerable mathematical games by changing these conditions and can come up with the type of flow pattern that will result -- resulting from the existence of a particular structure or of a planned structure.

All right. These are some of the conditions that we have to consider if we are going to look into the effects of pollution on estuary waters.

Now, let me change hats a wee bit and take my hat off as a professor and put it on as a member of the Environmental Control Committee of Brevard County.

In Brevard County, we have a pollution problem. This pollution problem is realized by the county commissioners, and thus they formed an Environmental Control Committee made up of technical people from the area.

Mr. McLouth, who talked just a few minutes ago, is the Vice-Chairman of that committee. I am one of the members of that committee.

As an attempt to try and decrease the pollution problem in Brevard County, the Environmental Control Committee recommended to the county commissioners and the condition was passed, that we limit the existence of, or the putting in of, new septic tanks, that any structure where a septic tank was going to be built had to be put on at least one acre of ground.

Now, this is a necessity, because in all of this area, even though we are several miles from the Indian River, the water drains through the ground into the river.

This, we felt, was a necessary condition to try to arrest the pollution growth in Brevard County, although it imposed an extreme hardship upon the land developers and builders of Brevard County.

As a matter of fact, more than extreme hardships -- it has aroused their considerable antagonism to us, to say the very least. We are, as a matter of fact, next Monday night, going to have a very warm session of the Environmental Control Committee on the whole problem of land fill and bulkhead lines.

I am most thankful for the information I have gained here from this meeting, because I will carry it to the Environmental Control Committee next Monday.

As an important part of the Environmental Control Committee, or as a side of that, is the Oyster Management Commission of Brevard County, in which we are trying to find out how the oyster industry can be expanded in Brevard County.

We have approximately 125 miles of land available, or of oyster bottom available, in Brevard County, and yet there are only about 32 miles that can be used because of the limitations put on by pollution.

There is another small number of miles that are conditionally opened, and so as an attempt to overcome this, we hope to build the first depuration plant in Brevard County within the remainder of this year in which, then, the oysters will be able to grow in waters that do not meet these standards for purity and that will be taken to a depuration plant and cleansed.

There are other activities going on in Brevard County relative to pollution, and to cover this, I am going to have to put on another hat or back on the hat of the Director of the Research at Florida Institute of Technology.

We have a program which is sponsored by the National Science Foundation called the "Cooperative College School Science Program." This program is designed to develop research capabilities in the high school teachers and in the high school pupils.

As a part of that program, we have instigated a pollution study program. At the present time, we have seven high schools in south and central Brevard, and they are making a timestudy of pollution in the tributaries to the Indian River.

These include Turkey Creek, Crane Creek, Elbow Creek, the Eau Gallie River, Horse Creek, the mouth of Banana River, and Sikes Creek.

The program is being expanded next year to include both Orange and Indian River Counties. This summer, as part of this expansion, I hope to have 20 high school teachers from these three counties in a summer institute at F.I.T., and these 20 teachers will be thrown right into the midst of the pollution problem because they are going to be having to take samples -- bacteriological, chemical, metallurgical flow samples.

They are going to have to reduce the data. They are going to have to report on the data and write a paper.

So we are trying to use this for an educational effect to the people on pollution, as well as to train them in pollution methods.

Florida Institute of Technology also has a contract with a company in which they are testing a new nuclear-powered bacteriological decontamination system. There's a mouthful for you!

The company has a patent pending on both the method and the device, and we at F.I.T. are going to perform the bacteriological testing for the device.

This is perhaps one of the largest potential breakthroughs that I have yet seen in pollution abatement. The device will use either Cobalt 60 or Cesium 165, and the energy from these nuclear materials can completely kill the bacterial component of sewage.

There is much work that can be done in this line, which will come up in time or around in time. Here I have talked to you about something that is being done in Brevard County on pollution, but what needs to be done for pollution in general, and this includes Brevard County and other locations, is Number 1, we can very easily make a single statement, "We need money for research."

This is perhaps the only single way that we can cover the matter, but we can't be this flippant and merely pass it off in this easy manner. What types of research need to be performed?

Number 1, we need considerably more information on bacteriological contaminants. A water system is not just contaminated or not contaminated. Pollution is a dynamic condition.

It changes with time and with location. We need to carry out time-studies of pollution similar to what my group and myself are trying to do with the high school students in Brevard County at the present time.

We also need to make three-dimensional studies. At the present time, 99.9 percent of all the pollution information is obtained by what is normally classified as grab samples, a mere sample off the top of the water.

Actually, a few samples have been taken at other depths. In one particular measurement on the Fenholloway River, a measurement of 7500 fecal coliforms per 100 millimeters of water was found at the surface of the water; at a depth of eight feet, the count was 240,000 fecal coliforms.

At the present time -- incidentally, Florida Institute of Technology does have a proposal in to the Federal Water Pollution Control Administration to perform a cross-sectional analysis of bacteriological conditions in the Banana River.

Another aspect of bacteriological conditions is sediment sampling. How is the sediment a function of the bacteriological pollution?

The second pollutant condition is chemical pollution. We can almost go down the same line of variables with the chemical pollution as we did with the bacteriological pollution.

In the present study that we are carrying on with the high school students in Brevard County, we are making both bacteriological samples and chemical samples of the pollution conditions.

And another large problem is how much of the pollution from the estuaries is flowing out into the open ocean. We have a wonderful condition for this study in Brevard County, and that is at the Sebastian Inlet in which we have a flow both in and out, and if anyone has ever flown over the area, you can see a beautiful ring when the tide is going out around in the ocean of where the water is from the Indian River flowing out into the ocean.

Now, this condition is going to be of increasing importance to all people down along the coastline.

How does this pollution vary as a function of position from an outlet? And when we talk about using outfalls for controlling our pollution, how does the pollution vary as a function of distance from it?

Remember that the gradient of these factors is the important aspect of it.

I want to put my emphasis on a point that Dr. Dean from the University of Florida brought up for the need for much more detailed logical studies in these estuary areas.

As part of the high school pollution study program, we have instigated a rather intense micro-meteorological rain-guage station. Each student involved in the program made his own rain gauge and has it in his back yard and makes daily measurements.

We need a much greater program for other meteorological aspects.

I also want to emphasize the point that Dr. Idyll brought out as far as temperature effects. Again, we have some new thermal hydroelectric plants going in on the Indian River by Orange County Electrical Facilities, which gives us an excellent opportunity to measure the effects of thermal attributes to an estuary.

The effects of bulkheads need to be further investigated. Dr. Dean's work on actually constructing models working and examining these flows is an excellent research aspect.

I do feel that considerable work can be done also from the aspect of numerical models by various types of computer techniques.

A great deal more investigation needs to be done on the effectiveness of various methods of controlling pollution, such as the one which F.I.T. is carrying on on the nuclear device.

On that particular device, for instance, we have very little information as to the effect this would have on controlling the amount of detergents in the water.

We know that nuclear energy does decompose detergents, but this effect has not been completely investigated.

In conclusion, I would like to say that when we are studying pollution, we want to be sure that we define exactly the type of pollutions that we are talking about, the effects that we are talking about, from these types of pollution, because if we don't, we are likely to get completely the wrong concept of the need for control.

And finally, I would like to make a short statement to Mr. Jensen. He stated back in his report to the Interstate Conference on Water Pollution that they were hoping to contract work out to universities which had a vital interest in pollution study.

Well, Mr. Jensen, F.I.T. has a vital interest in estuary work and pollution studies. We are ready, willing and able to help.

MR. THOMAN: Thank you very much, Dr. Woodbridge.

I would next like to call on Mac Cunningham, representing the Florida Municipal Utilities Association, Lakeland, Florida.

MR. MAC H. CUNNINGHAM: Thank you, Mr. Chairman. I have no prepared statement, but I appreciate the opportunity to say a few words here.

I am Vice-President of the Florida Municipal Association and Executive Vice-President of Florida Municipal Utilities Association, an association composed of Florida cities that own and operate electric utilities.

Most of our power plants are in the corporate limits or adjacent to the corporate limits, so in this matter of pollution -- our interest is twofold.

We realize the benefits of clean water adjacent to our cities and also we need the water to generate electricity. So our main interest is thermal pollution.

I will be frank, Mr. Chairman, I never heard the expression "thermal pollution" until last summer when the Governor's committee was meeting in setting up standards for water.

At that time, it appeared to us that they were taking criteria and standards that had been developed in other sections of the United States and trying to apply them to Florida.

So my object is, in speaking this morning, that we would like to have further studies on the effects of thermal pollution on our waters, and we don't think that applying standards that they have developed in other sections of the country would be applicable to our water here.

And the main thing I did want to get on record is how our association felt -- how our members will be ready and willing to work with any group that is set up to study the problems at any time.

MR. THOMAN: Thank you very much, Mr. Cunningham.

I would next like to call on Mr. Raymond Gage, Executive Director, Florida Ports and Foreign Trade Council.

MR. RAYMOND W. GAGE: Good morning, Mr. Chairman. Ladies and gentlemen, I am Raymond W. Gage, Executive Director of the Florida Ports and Foreign Trade Council.

The ports of Florida recognize the potential hazard caused by the industrial occupancy of the ports and any oriented pollution that might result from such operations.

Preventative steps have and are being taken by the ports of Florida. We have been working very closely with the Board of Conservation and other state organizations and will continue to do so.

If there are any specific questions that you may wish to ask, I have with me Mr. Arthur Darlow, President of the Florida Ports and Foreign Trade Council, and Mr. Joel Wilcox, Immediate Past President.

Mr. Darlow is from the Port of Miami, and Mr. Wilcox is the port director of Palm Beach. I also have with me Colonel Guy N. Berger, the Deputy Port Director of Tampa.

Mr. Chairman, if there are any specific questions you would like to ask any of these gentlemen, I am sure they would be glad to answer. Thank you.

MR. THOMAN: Thank you very much. Are there any questions?

MR. PAUL TRAINA: Just one question. I assume that the ports of Florida, like most ports, have port masters. What is their responsibility with regard to situations like oil spills and things of that sort?

MR. GAGE: I would like to have Mr. Wilcox answer that.

MR. JOEL WILCOX: You use the term "port master." I believe you mean "harbor master," as used in this area. The old system of harbor masters has gradually disappeared.

Very few of the ports now have harbor masters in the term we used to use it. The responsibility for maintaining the condition of the port falls directly under the port director.

I would like to make a very brief statement here with regard to oil spillage. This has been mentioned rather prominently in the area of pollution. It's more of an aesthetic pollution, however, than damage to wildlife is concerned.

It can be controlled. The statement was made that the Florida ports -- or the ports of the United States, probably 99 percent -- are ill equipped or unequipped to handle such a matter.

This is not exactly true. It can be controlled. We have controlled it in the Port of Palm Beach. It's a very simple matter.

The first thing you want to do is contain. The second thing you want to do is mechanically remove it from the water.

I think the attempt to sink the oil and get it out of sight is a mistake. We at the Port of Palm Beach have, unfortunately, had quite a bit of experience with this oil spillage.

We have seemed to have gotten more than our rightful share of it. I don't know, unless we have done something wrong as far as the preparation is concerned, but we have had broad experience.

We have recently had two spills where some of the oil got away from us. This is because of freak conditions that arose -- strong winds in the vicinity of 30 miles an hour coming out of the west blowing the oil out into the open waters.

The last one, in order to clean boats and clean bulkheads and so on, it cost about $60,000. However, I have never seen, in all of the oil spills in the port, a dead fish as a result of an oil spill.

I have seen birds that have gotten so ill -- I have never seen a fish deliberately swim into an oil spill. I have never seen one swim into a tree trunk either.

But I have seen boatmen do both of those things. All I have got to say is, fish have got more sense than boatmen.

MR. THOMAN: Several years ago, we had a massive fish kill in the lower regions of the Mississippi River, and scientists from my laboratory in Athens ascribed this to pesticides that were dumped in the river at Memphis, Tennessee.

The company that manufactured these said that this couldn't happen -- after all, it didn't kill any fish between Memphis and Baton Rouge.

It was two years later when someone got smart enough to find out that there weren't any fish between Memphis and Baton Rouge. I wonder if this might be the case down in the Port of Palm Beach.

MR. WILCOX: We are very proud to say that we have a good concentration of snook, bluefish and so on in our waters, but the pollution that occurs around the port is more likely to be waste material from ships -- we have regulations that prevent ships from dumping any material over the side or allowing any discharge of anything in the waters.

But unfortunately, we have a bunch of old ships in service now, and they don't have any means of containing this material onboard.

MR. THOMAN: Do you have any facilities for them to dump their bilges, dump their bilge water?

MR. WILCOX: Yes, we do, but there is an international law against dumping ballast waters.

MR. THOMAN: That still doesn't stop them from dumping them in ports.

MR. WILCOX: But you can sure fine them. We need to strengthen the Oil Pollution Act of 1924 and the Refuse Act of 1899.

Last year, in 1967, we had 458 violations of those two laws in the United States. It takes quite some time to determine which of these laws has been violated.

And who is going to prosecute it, because the old Refuse Act is under the Corps of Engineers, and the Oil Pollution Act of '24 is under the Department of the Interior, and the Oil Pollution Act of '66 is under the Coast Guard.

MR. THOMAN: No, it's under the Department of the Interior.

MR. WILCOX: I'm talking about the offshoremen.

MR. THOMAN: The Convention on the Pollution of the Sea by Oil --

MR. WILCOX: We need to be able to levy some stiff fines. We need to be able to put some people in jail, very frankly. We have had cases where bilges have been pumped purposely, because the engineer wanted to be fired so he could go home.

The captain wouldn't let him off. He wrote "Pump bilges at 1100 hours," and they did it, and he was sent back to England. He should have been sent back to jail.

MR. THOMAN: Mr. Wilcox, the part of this transcript that is going to be dealing with oil spills is going to be extracted and submitted to the Subcommittee for their edification, and if you would care to submit a statement to us, I will assure you it will be incorporated in that package.

We would like to have your thoughts on this so we can pass it along.

MR. WILCOX: I would be very happy to do so. I just recently submitted such a statement to Congressman Paul Rogers, outlining what the American Association of Port Authorities is hoping can be done in this area.

We want to remove the restriction in the law that it must be negligent discharge or negligent pollution. Right now, it's got to be an act of negligence.

MR. THOMAN: Are you familiar with Senate Bill 729-70?

MR. WILCOX: Is that being considered?

MR. THOMAN: It hasn't been considered yet in the Senate. This does take off that willful negligence clause.

MR. WILCOX: They should redefine "discharge" to mean "leakage" due to structural failure. The gentleman here today wanted to know why we don't have good tankers.

Your solutions to problems -- unfortunately, we tried to talk them to death, and I think that's what I'm doing here. The solution to the problem, you have got to go back to what caused the problem.

Now, believe it or not, the reason that we don't have good tankers right now and can't keep them out of the water is the fact that the Suez Canal was closed, and an incident that far away resulted in putting 1300 tankers back into service.

These were taken out of scrap heaps, out of mothball fleets. Maintenance was deferred and so on. It had to be done in order to continue the supply of oil to the world, and we can't live without it, so we are faced with the possibility every day of another ship breaking up.

Now, for the last three or four days, I have included in my prayers a little thanks for the fact that that ship that broke up down in Puerto Rico did so before it got to the Port of Palm Beach.

That very well could have happened in my port, and there wouldn't have been a thing I could have done about it. We do need some regulations with regard to these older ships.

We're going to 200,000-and 250,000-ton ships, and this is going to be brutal if one of those things ever springs a leak. Thank you.

MR. THOMAN: Thank you very much, Mr. Wilcox and Mr. Gage.

DR. NICHOLSON: You made a very important statement, and that is that you do not believe in disposing of this spill of oil by sinking. Could you explain why?

MR. WILCOX: Well, there are a number of products that are on the market today that dispose of oil, and I use the term "dispose" in quotes. It used to be the theory that you throw sand on it or throw lime on it and sink it.

All it does is get it out of sight and it goes somewhere else. There are detergents that will hold it in suspension for as much as 2400 hours. In this length of time, it has gone somewhere and it comes back on the surface way out at sea where nobody is going to be bothered by it.

If we knew that there was a material that would change the structure of the oil so that it could be actually disposed of, rather than hidden, then I say we ought to do something with it.

But most of this oil we are talking about is bunker or residual oil, and this is whatever is left after you have taken all the useful products out, and most of it is solid.

If you had some way to eliminate these things that hold these solids together, then they are not really pollutants and we could get rid of them in that way.

I would much rather see it removed mechanically. Now, we built a very simple machine at the Port of Palm Beach that is extremely efficient for skimming the oil off of the surface of the water.

The last spill we had, we recovered 75 barrels off of the surface of the water within our own terminal.

Recently Dr. White, Vice-President of American Oil Company, and I think he is in charge of their research in this area, developed an improved skimmer.

This skimmer is simply a pontoon device. It has a revolving drum, and it will readily absorb oil, but will not take in much water. As this revolves on the inboard side, there's a pressure roller that squeezes the oil out, and it then is put into a container.

He is presently using a big plastic sausage. This can then be removed, and he says that this will work at about the rate of 50 barrels an hour. This type of thing should always be used first.

Every port should be required, and I am proud to say that as far as we are concerned, we require it, and we are the only port in the United States that does require it, that a slick bar be put around the ship before it starts to discharge.

Now, this is a simple thing to do. It is simply a floating dam that surrounds the working area. Then if you have spillage, you contain it. This should be put in first.

Don't wait until there is a spill. This ought to be automatic that this is put into place. We require a 24-hour watch on all tankers. The man has to make a periodic report, and his report doesn't say, "I found oil."

It says, "Yes, there was oil," or "No, there was not oil." He must make a negative as well as a positive report. He must also watch for the emission of smoke from the tanker, and he puts down when the smoke started, and when it stopped and what action he took to stop it.

In case of an oil spill, certain people are immediately notified, and the gang goes to work instantly. There's never a question. This should be done in every port in the United States, and it can be done.

It should be done at every port, at every oil dock, and it can be done at every oil dock. It's not an expensive thing, and would -- with just a little bit of ingenuity, you can develop this or adapt this method to any body of water anywhere in the world.

MR. THOMAN: Mr. Wilcox, again, let me ask you, would you please submit these regulations and things for the record. This is most interesting, and incidentally, that American Oil Company machine is being tried out in actual practice in San Juan right at the moment, and there are very, very small amounts of detergents being used.

Thank you, again, Mr. Wilcox. I look forward to getting your statement for the record.

MR. WILCOX: Thank you.

MR. THOMAN: And thank you, Mr. Gage. I would next like to call on Mr. Gurney of the Orlando Utilities Commission.

MR. J. THOMAS GURNEY: Mr. Chairman and gentlemen: My name is J. Thomas Gurney. I am very grateful for this opportunity to speak, and I will speak briefly.

I did not have the opportunity to prepare a written statement, because I learned of this meeting too late to do that.

I would like, however, the privilege of preparing and submitting in due course a statement which will more or less outline what I have to say.

MR. THOMAN: Fine. If you get it to us within 15 days, we will incorporate it in the record.

MR. GURNEY: Thank you, sir. Although I do not represent all of the cities who are similarly affected, I think I am representative of them in speaking for the Orlando Utilities Commission.

I would like to accept the remarks which were made by a speaker who preceded me from the Florida Institute of Technology, and I certainly say that I am in hearty agreement with most of what has been said here over these two days.

I would like to say this, that there are about eight, maybe nine, municipally operated utilities in the State of Florida which use cooling waters from estuaries, and perhaps three or four more which use cooling waters from lakes.

Well, there's Tallahassee, Jacksonville, New Smyrna; there's Orlando, Fort Pierce, Lake Worth, and there's Key West. I know of those.

I don't think it is the policy or the intent of any of them, or perhaps not of the entire industry, to attempt to block progress in any respect. I would heartily support the Commission, the Commission which I represent would heartily support research into any problem which affects our operations or which affects the public through our operations.

I am not convinced from what I have heard, and I have heard experts on both sides of this problem of thermal pollution, I have heard different views expressed -- I don't think anybody wants to run from the truth or I don't think anybody wants to sweep a problem under the rug.

But I do think that before restrictions are taken, or action is taken, which impose indirectly burdens upon the general public, that proper scientific foundations must, or should have been laid.

When that has been done, I think that industry will live up to its obligation to be fair to the public. However, if that is not done, then, in effect, if large expenditures of money are required, it is, in effect, the leveling of an indirect tax upon every consumer in the area served.

So if I can contribute anything here, and I hope I may, it would simply be this, that before action is taken of a restrictive nature, and one that will cost money, and may I add, that it would be perhaps much more of a burden upon the smaller municipally operated plants than it would be upon the larger privately owned ones, that an objective search be made to determine the truth with respect to this problem of thermal pollution.

If that's done and it is found, then you have a problem, and we know it. It is unfortunate, it seems to me, that the phrase "thermal pollution" has been coined.

Now, what it means -- I know what it means, but the public generally doesn't know what it means, and it's very, very difficult for them to define the area of thermal pollution as distinguished from the other types of pollution which we have in these waters.

There is an expression not well founded, I realize, that it is some sort of deadly emission which comes out of the operation of these plants. I say that is regrettable.

I don't know the solution. There may not be any, but I do know that it exists. I have heard suggestions here with respect to cooperation with proper authorities on the location of these plants.

I think that is a very splendid idea. I think anybody should be willing to look and determine the feasibility of the location of plants, but after all, we are going to have to have plants.

There isn't any question about that, because as the demand increased, and incidentally, these plants have grown up as a response to public demand, I have been told that this is the largest capitalized industry in the United States.

I don't know whether that is true or not, but I know it is big, but that came about because of the requirements of the public.

Now, I realize, also, that there are other people whose rights are affected, and that those rights should be respected just as much as those who are engaged in this business.

I have been in the state 40-odd years. I am a fisherman of the first water. I love to fish. I have seen some fish killed by cold water during cold spells.

I have seen a few snook that have been killed. I have never yet seen a fish killed by hot water, but that doesn't mean that it cannot be done, and I don't mean to infer that there isn't a problem here that may well be.

I don't think it's beneficial, necessarily. I don't know that it is, and I don't know that it's harmful. I'm sort of neutral on that subject.

But Mr. Chairman, and gentlemen, I think that I can say, on behalf of the one group, at least one organization, that any reasonable requirements that are imposed in the interest of the public are not necessarily something to be resisted.

It depends, of course, upon the extent of those requirements and the ability within the limitations of capitalization, and expense and so forth to meet those requirements, but that doesn't mean just pulling back on the halter and not being willing to do what is possible and what can reasonably be done to comply with any sort of regulation which will improve the general environment of the community and of the people in the community in which we live.

MR. THOMAN: Thank you very much, Mr. Gurney. We will look forward to receiving your statement for the record. There are several things that I would like to comment on.

One of them is that just because of this increased demand for electric energy is just exactly the reason why those of us engaged in pollution control feel that there is need for the control of future heat emissions from the thermal generating plants.

In the past, this probably was not too great a problem, but with these increasing demands for electric energy, the problem of controlling heat in the future is going to become increasingly complex.

Secondly, it is generally well known that the higher the temperature, the less the dissolved oxygen a water body can hold. Many, many municipalities and industries treat their wastes on the basis of receiving bodies of water having a certain amount of oxygen in it, and raising the temperature of that water inhibits the ability of that body of water to hold oxygen, so it is no more different, thermal pollution or heat, let me put it that way, added to the water is no different than any oxygen demanding waste put in the water.

I think these are facts that we know. Whether or not this will lead to more stringent regulations or not, I can't tell, but there appears to be a trend in the United States, and it is much more complex in the State of Florida, because of the high air temperatures here, there is a trend in the United States to put increasing restrictions on the discharge of heat.

I won't call it thermal pollution, but it is, in effect, a pollutant that alters the environment, if we can accept that it is a pollutant.

MR. THOMAN: At this point in time, I would like to note for the record that the Zoological Society of Florida will submit a statement for the record; that a statement has been submitted for the record and will be included in the record from Mrs. Virginia R. Forrest, Director of the Florida Audubon Society; a short statement has been submitted by the President of the Soil and Crop Science Society of Florida; and a statement has been submitted by the Secretary-Manager of the Walton County Chamber of Commerce; statements have been submitted by Mr. Eddie Hafner of the Florida County Commissioners Association; by Mr. Harold Scott, a representative of the Orange County Audubon Society; and a statement has been submitted by Mr. Jack P. Fitzgerald, Port Director of Tampa Port Authority.

At this point, I would like to call on Mr. Robert G. Proctor, Master of the Florida State Grange. Mr. Proctor.

MR. ROBERT G. PROCTOR: I am Robert G. Proctor, Master of the Florida State Grange. I live at 1404 Dartmouth Drive, Bradenton, Florida.

The Grange, for many years, the nation over, has worked and fought to protect, develop and preserve all of our natural resources.

Estuarine areas are vital to everyone in the State of Florida, not only because of their financial value due to tourism, sports, recreation, scenic beauty, wildlife conservation, but also commercial and shellfish fishing, spawning and breeding areas.

Estuarine pollution will have its effect as we move closer to desalinization for water supplies. Perhaps the process purifies it, but I still do not care to drink from someone else's cesspool.

As our water table lowers one foot in the State of Florida, the salt water moves in 36 feet. This is problem enough without pollution.

With the increase of population, industry, the development of waterfront property and the construction of vast high-rise apartments along our shores and Keys, the control of estuarine pollution becomes tremendously important.

The Florida State Grange believes in local and state controls whenever possible, but, in many cases, due to the competition for industry, pollution precautions are sometimes overlooked by local authorities and pressures applied when some do try to do their job.

Shoreline and Key development and high-rise apartments many times overtax the local sewer systems, and because of expense and in the name of progress, the dumping of sewage waste into estuarine areas is overlooked.

Therefore, it is felt by the Florida State Grange that not only effective laws, rules and regulations must be enacted, but control must be made effective, so that large industry that does not listen to local authorities, and local authorities who ignore their duty, might have some effective pressure applied.

Thank you.

MR. THOMAN: Mr. Proctor, thank you very much.

I would like next to call on Mr. Holmes from the Sarasota Audubon Society.

MR. CHARLES W. HOLMES: For the record, my name is Charles Holmes. I am representing the Audubon Society. I work for the Sarasota County Health Department as an assistant -- or I shouldn't say an assistant -- I am Acting Director of the Engineering Section.

In Sarasota County, I think the people are more together on pollution control than any other single issue. Certainly, the press -- and we have a representative of the press here, Mr. Clyde Burnett, who does very good articles continually on pollution control.

The people of the county are extremely alerted to the possibilities of pollution, and so, as I say, we are very much together that way.

Now, in Sarasota County, we have had a Code on Air Pollution, and recently, we included water as part of that code. Now, we have an Air and Water Pollution Code, a local code, so that all of the contributors of air and water pollution in Sarasota County are licensed by the Sarasota Health Department, and this includes the city, as well as the county.

Pollution control is a popular item in Sarasota County. It's in the same class with being against an increase in ad valorem taxes or for motherhood.

They aren't so sure about motherhood now with the wide dissemination of the "pill."

I think that I should describe Sarasota County's bays. It's a breathtaking sight to see our 35 miles of coastline of the bays. We have four keys that align the coastline.

They are Longboat Key, Siesta Key, Casey Key and Manasota Key. And the bays at the narrowest point are probably a quarter of a mile and at the widest are probably from one to two miles wide.

One of the things that we found is that the bays aren't so deep in Sarasota County. Recently, we had a channel deepening from the inland coastal waterway, and any good-sized yacht can travel up and down Sarasota County, and yet, sometimes if they get out of the channel, why, they become grounded.

There is very little tidal flushing in the bays, and so you might say that there is a limited change between the Gulf and the bay waters.

In Sarasota County, we have some half-dozen creeks and bayous, and we have one river, the Myakka River, and these creeks and bayous receive all the effluent from our 49 sewer plants.

We have some 14 private franchised sewer companies which "treat" the sewage, using primary and secondary type of treatment.

The principal treatment plants are: trickling filters, contact stabilization Imhoff and pond, mechanical aeration, preaeration - trickling filter and pond, and various combinations of what I have said.

What do we know about estuary pollution in Sarasota County? We require and insist on monthly operating reports of each sewer plant. We know we still have as many as 15,000 septic tanks still in operation.

We have been taking monthly coliform bay samples to support our shellfish programs since 1962.

We have learned that having a sewage-treatment plant doesn't mean that you have solved all problems -- you no longer have septic tanks, so there's no problem left.

Complaints of Whitaker Bayou residents stated that the sewage plant effluent was ruining their stream, that the bayou "smelled to high heaven."

Reluctantly, a survey was made by the State Board of Health in the fall of 1962, when the tourist hadn't arrived. They found 37 major deficiencies.

Lift stations were broken down; raw sewage was running into the bay. Sarasota hired a good engineer to run the plant, and in one year's time, he had a preventive maintenance program set up where all lift stations are checked every day.

The city's problem now is that the plant is overloaded.

I would like to further submit now that in 1967, a survey report on the City of Sarasota was made on sewage-treatment plants and lift stations.

Now, for the past six month, the Water Pollution Control Division has concentrated on equipping a laboratory in which water samples can be tested for the most common pollutants.

Except for an autoclave, which should be received early in October, all equipment and reagents have been received to make the following determinations:

1. pH
2. Ammonia
3. Nitrates
4. Nitrites
5. Phosphates (Ortho)
6. B.O.D.
7. MPN B-Coli
8. Alkalinity
9. Chlorides
10. Sulfides
11. Dissolved Oxygen
12. Turbidity
13. Oxidation-Reduction Potential
14. Chlorine Residual
15. Chlorine Demand

The MPN determinations for coliform bacteria, thus far, have been made in the State Board of Health Laboratory in Tampa, so that now the city is really bearing down and working with the Health Department to try to get some of the facts about pollution, and so that recently in a survey of the same Whitaker Bayou, they have taken samples of phosphates and nitrates, because now they are very much interested in the nutrient problem.

So the most probable number has ranged from as low as 100 up to 1,600,000, so that sometimes something does happen in the treatment process.

MR. THOMAN: Mr. Holmes, could I ask you rather rapidly to summarize your other exhibits there. We will incorporate all of them in the record.

MR. HOLMES: Okay. Exhibit Number 4, it's an engineering study made by Smally, Wellford and Nalven. Now, one other problem that we have in the county that we have a great number of is package sewage-treatment plants, and we have also 13 franchise companies, so that the engineering firm of Smally, Wellford and Nalven has made a report which is called "Engineering and Economic Feasibility of Water and Sanitary Sewerage Systems for the County of Sarasota."

Now, briefly, what this report has said is that the county now should consider having and operating a sewer system on their own, which would be county operated, or it could be in combination with some of the existing franchise sewer companies.

In this way, it would cut down on the number of sewage plants dumping effluent into the various waters and it would recommend that the effluent be used inland and pumped inland and settling basins and different methods of disposal be used than is now being used.

In order to wind it up, I would like to say that in Sarasota County, we have a great many organizations that are very much interested in controlling pollution.

We have the Audubon Society, Community Goals, the Advisory Committee on Air and Water Pollution and Planning, Manasota 88, which is a two-county group that is interested in environment, and we have committees on pollution control with that.

And we have the Sarasota Civic League; we have the League of Women Voters, which has a project on pollution control; Sarasota Garden Club; and so we have a great many organizations involved.

Now, to wind up, I would like to say that I have eight recommendations for your consideration.

1. Come up with a better and more inclusive definition for pollution.

2. Work for better cooperation and coordination of official agencies.

3. Obtain and devise better methods and ways to measure pollution.

4. Exhibit Number 7 is an example of the biotic table of stream classification. I think we have ignored the biology of streams, and certainly, I think that more consideration should be given to that aspect of it.

5. Start immediately to find use for the waste water for irrigation purposes and "recharge" for our underground water supplies.

6. Immediate control through legislative action to prevent boats from dumping raw sewage effluent into our waters. Let them do the same as buses and airplanes -- no dumping.

Have only holding tanks that will have to be pumped into treatment receiving stations.

7. Set up strong county planning departments that will work with a strong state planning department who, in turn, will work with a federal planning department. Prevention of pollution by preplanning is a must.

8. Adequate control over dredging and filling. Wide areas of dredging have depleted shellfish and other marine life in Sarasota County.

9. Education of the public of the proper use of chemicals and fertilizer to prevent drainage run-off which causes pollution.

And that completes my report. Thank you.

MR. THOMAN: Thank you very much. I assure you that all of this will be incorporated into the report.

At this time, I would like to call John L. McQuigg, a member of the Governor's Natural Resources Committee. Mr. McQuigg.

MR. JOHN L. McQUIGG: Thank you, Mr. Chairman. I am appearing here today as a member of the Governor's Committee on Natural Resources, and as a member and director of the leading conservation organizations in Martin County and south Florida: the St. Lucie Rivers League, the Audubon Society, Izaak Walton League, Sailfish Club, Safe Inlet Committee, and the Martin County Conservation Committee.

It is encouraging to have a hearing and the start of a program to preserve and enhance the vital estuaries of our nation, and particularly, of Florida. Estuaries and their rich bottom lands are the most productive areas on earth.

They are a delicately balanced basic factory of animal and plant nutrients, indeed, the very essence of the chain of life.

Without their spawning and nursery grounds, commercial and sport fishing literally could disappear, and this sad loss would be irrevocable.

Your hearing has been convened to hear evidence, ideas and suggestions on the protection, enhancement and values of estuarine areas.

The following points are respectfully submitted:

1. Economic values: A paper researched and prepared two years ago demonstrated that the direct value of Florida's estuaries to this state's economic flow exceeds 1.5 billion dollars per year.

This represents the values produced by commercial and sport fishing, bait, boat industries, tackle sales, tourist attraction, marinas, charter boats and similar categories.

It does not include the attraction of affluent retirees and clean industry, the attendant building and retail trade from this influx, real estate sales and many other economic values for the State of Florida.

These indirect contributions well could be at least the size of the direct expenditures.

2. Recreation value to the public: Residents and visitors alike draw unbelievable values from the fishing, boating and swimming that are dependent on the purity and preservation of our estuaries.

Florida Development Commission research shows that 31 percent of our visitors come to Florida solely for the fishing.

Recreation Commission figures show that 42.5 percent of our residents are regular salt water fishermen, 31.3 percent, regular salt water boatmen.

They spend 59,800,000 man-days on the waters -- an average of at least 14 days per year for every soul in Florida. With the tremendous growth of recreation pressures, this is an asset far beyond dollars.

3. Dedication of shallow bottom lands: Florida owns, in trust for the general good of its citizens, hundreds of thousands of acres of prime bottom lands, much of it pristine and, so far, unharmed.

There should be an organized program of dedication of these bottom lands in perpetuity to protect them and to preserve their assets for generations to come.

4. Dredge and fill policies: Restrictions on dredge and fill, and the establishment of bulkhead lines should be strengthened and enforced.

Bulkhead lines should be one foot above mean high water and should be statewide or areawide to prevent a vicious circle of progressive destruction.

5. Fresh-water discharges: Flood-control projects designed primarily for drainage and land-reclamation have done incalculable harm to our estuaries, particularly in the St. Lucie estuary.

Prolonged discharges of as much as 14 billion gallons of fresh water per day have killed the brackish ecology of this estuary and driven out or killed fish, crustaceans, shrimp and oysters.

Siltation has created further destruction. Present U. S. Engineers proposals will ameliorate these damages; they should be pushed without delay and future work should be designed for conservation of fresh water, rather than wasting to the sea and destruction of vital estuaries.

6. Pollution: Estuaries must be protected by adequate and enforced restrictions on pollution. This includes pollution by fresh water and silt, raw or inadequately treated sewage, and perhaps most destructive of all, the unrestrained discharges of agricultural and industrial operations.

7. Thermal pollution: Much research needs to be done on this new form of potential pollution. It seems obvious that major changes in water temperatures could have dramatic effect on the ecology of areas in which it occurs.

The major point in this category of problem is that knowledge should be gained before the fact. The cost of corrective measures -- even if they could be effective -- should be far greater than the necessary caution that should be exercised.

It is realized that this statement only skeletonizes the needs and problems of conservation of our vital estuarine areas. The major point is the almost unbelievable value of our estuaries, and the crucial problem of their preservation and enhancement. Thank you.

MR. THOMAN: We appreciate that statement. Mr. Jensen.

MR. JENSEN: Sir, I would like to ask for your general ideas on countywide or statewide planning as it might relate to dredge and fill operations. It's a big state, I know.

MR. McQUIGG: I am a firm believer, and we have lived through this in our county and adjacent areas in southern Florida, where each municipality, each county, has the authority to establish its own bulkhead line.

You wind up with a vicious circle, one being 400 feet, and the next one 1500 feet, and then a conservative-oriented one of mean high water.

It seems to me that bulkhead lines should be planned, taking into consideration the whole stretch of the estuary, and not result in bulkhead lines that are unaesthetic, as well as bad conservation and bad for wildlife, if that is an answer to your question.

I believe they should be areawide and perhaps statewide. Exceptions are easier made than getting the whole, if they have to be, than getting the whole thing done. Thank you very much.

MR. THOMAN: Thank you very much. I would next like to call on Mr. Sydney O. Chase, Jr., President of Chase and Company, Sanford, Florida. Mr. Chase.

MR. SYDNEY O. CHASE, JR.: Mr. Chairman, ladies and gentlemen: My name is Sydney O. Chase, Jr. I am President of Chase and Company in Sanford, Florida. We produce and market citrus and vegetables.

I am also President of the Florida Fruit and Vegetable Association, a nonprofit agricultural trade association incorporated under the laws of the State of Florida, with headquarters at 4401 East Colonial Drive, Orlando, Florida.

Its membership consists of major producers of citrus fruits, vegetables, subtropical fruits and sugar cane. The membership also includes processors and shippers of these products.

I take this opportunity to express the appreciation of the members of Florida Fruit and Vegetable Association for the privilege of appearing before your committee for the purpose of informing you that the agricultural industry of Florida recognizes the importance of restoring and preserving the purity of the state's estuary rivers and bays.

Conservation, while not a direct pollution problem, is a very important subject. Due to development of highways, railraods, subdivisions and housing developments, little or no thought has been given to conserving the water which they are draining away.

The Central and South Florida Flood Control District has done an excellent job. We all know that there were many recharge areas, such as ponds and lakes, throughout Florida into which the water would run in wet seasons.

Now that water has been diverted into rivers or the ocean, the recharge areas that maintain our ground water have been, in many instances, entirely eliminated and, in others, greatly reduced.

Florida's largest industry is agribusiness, but it has a rapidly developing tourist and industrial potential. With both of these facets of its economy inevitably comes accompanying water pollution.

Certainly, public health is a prime consideration, and I am sure that all boards and committees are properly concerned about it.

My concern is that after first-priority considerations, there then becomes a choice between aesthetics or special interest groups as opposed to practical and workable procedures which will allow agriculture, industry and tourism to exist and prosper.

In other words, food has to be produced and industry has to make things in the public interest. There must be safeguards included in any control program at every level to protect agriculture and industry, because these two are essential to the public welfare and these same safeguards are recognized as necessary to the tourist industry, as well as the permanent population of the state.

The development of Florida has, naturally, followed the coastlines. Most tourists come to Florida for sun, sand and sea and remain to be citizens, settling along the estuary rivers and bays.

Most heavy industry wants access to water transportation and is also looking for a place to dispose of its wastes economically.

Tourism demands recreational facilities, among which salt water fishing stands high. Most salt water fish spawn in fresh water, but develop in the tidal waters of the estuary rivers and bays until able to meet competitive conditions encountered in deep rivers and oceans.

Kill the "fingerlings" in the estuaries, and you break the life cycle and damage the fishing potential.

The fresh-water rivers running into the estuaries which provide the spawning grounds must also be kept free of pollution, or the minnows never reach the waters where they naturally develop.

Bathing also ranks high with tourists and home folks. Too many of our estuary rivers and bays afford questionable safe bathing without danger to health.

Too many of our tidal waters carry the sign, "Do not eat shellfish from this area. Polluted water."

Much of this pollution is man-made, through improper sewage disposal systems from our towns and cities. Much is also contributed from industrial wastes being dumped into our streams, our estuary rivers and bays.

Florida is blessed with many natural assets. As an example, Florida is blessed with having large deposits of phosphate. The proper mining and processing of this blessing is cause for concern as more and more fertilizer materials are required to produce food for the world's escalating population.

Processing plants converting phosphatic materials into fertilizer components have allowed wastes, containing high volumes of toxic ingredients, to escape and some have reached our estuaries, creating "biological deserts" in certain areas.

Another Florida blessing is the development of the pulp and paper industry. The discovery that Florida pine can be converted into newsprint was made not many years ago.

Reforestation resulted in many cut-over areas, and a new, necessary Florida industry was created. Pollution from this source comes only from the processing practices used in converting the pulp into usable paper.

Wastes are created and toxic materials disposed of in the most economical fashion, through our streams and rivers.

Air and water pollution, insofar as industry is concerned, are closely united. Scrub the air to prevent air pollution, and you create potential water pollution.

The waste must go somewhere, and water pollution, in Florida, always reaches the great salt water reservoir through our estuaries and bays.

The most obvious answer is research to develop uses for industrial wastes. Make these wastes economically usable, and you have forwarded progress. Consign them to either the air or water "sewer," and you have created a pollution problem.

Much the same can be said for the human waste that causes so many estuary rivers and bays to become health hazards. More economical methods of processing sewage could result in untold thousands of tons of fertilizer materials being reused to produce food for the starving nations.

"Night soil" has long been the agricultural stand-by of the eastern nations. It contains most of the minerals and secondaries necessary for plant growth. Eliminate the disease factor and the pollution will become an asset that will save millions of lives and will prevent the depleting of natural reserves of minerals.

Man must, through research, gainfully use the materials with which he is now polluting our natural heritage of beautiful streams, sparkling tidal waters and plentiful foods from nature's vast storehouse.

Fortunately for Florida, there is an awakening awareness that pollution of both air and water are not necessary to progress -- that they can be controlled at a price and Florida is willing to pay that price.

New legislation creating control commissions at both the state and county levels is being implemented. New codes are being adopted and old ones strengthened. This type of progress is very costly.

It would appear that the federal program to implement such progress should be, in part, one of vastly stepped-up research efforts towards the adaptation of wastes into usable and economic materials.

As a result, industries will use, rather than dispose of such materials. Municipalities will make of their wastes usable materials that will be revenue producers for our towns and cities.

This type of research should be done at the federal level, as its results would benefit the entire nation, as well as the entire world.

It is not beyond the intellect of our scientific brains to do this job. It only remains to channel our thinking along the proper lines. Thank you very much.

MR. THOMAN: Thank you, Mr. Chase. As our last speaker on this morning's session, I would like to call on Joel Kuperberg from the City of Naples, Florida.

MR. JOEL KUPERBERG: As I sat here listening, I thought, "Well, there's one advantage to speaking at this time of day: Everyone is so hungry, they won't fall asleep."

I'm going to tell you a story that I hope will interest you, a story about a successful estuarine preservation project, the story about a plan to develop the areas around the estuary in such a way that if the development will not destroy the natural values -- the area is the area immediately south of the City of Naples.

Because of my involvement in this as a biologist and because of my former membership on the Naples City Council, I was asked by the Mayor to come and represent the City of Naples and tell this story.

The islands and estuaries of the Gulf Coast of southern Florida represent a natural resource of the highest value to the people of Florida and the nation.

They support a fishery of great recreational and commercial importance. They provide a home for a wide variety of tropical and subtropical wildlife including such endangered species as the manatee and roseate spoonbill.

They provide an outstanding setting for water-based outdoor recreation. At the present time, this region is subject to pressures that are altering many of its natural values.

Dredging of estuaries, filling of mangroves and marshes and construction of drainage canals represent some of the processes that threaten the future of the area.

Unless a way is found to proceed with urban development, which respects the natural environment, it is likely that southwest Florida will lose many of the qualities that are attractive to its residents and visitors.

In 1964, conservation interests in the Naples area, located in Collier County on the southwest Florida Gulf Coast, became aware that the beautiful and productive mangrove-rimmed bays and creeks just south of Naples could not be expected to remain in their natural condition in the face of growing pressures of urbanization.

Proposed construction of a road into the area, to be followed by development activities of various kinds, galvanized a number of the community's conservationists, nature lovers, sports and commercial fishermen and others into action.

The Collier County Conservancy, a private, nonprofit organization, was established. Membership in the Conservancy was opened to all interested citizens who wished to become identified with, and involved in, conservation activities.

The early efforts of the organization consisted in the registering of opposition to the plan to build a road into, and initiate urban development of, the area.

The planned road construction project was successfully blocked, forestalling the immediate danger to the valued natural conditions in the area.

The successful defense against planned construction in an area valued for its natural characteristics was recognized as merely a temporary victory, which gained the time needed to undertake a permanent solution to the then-identified objective of insuring continuation of the natural conditions of the area, in perpetuity.

Advice from marine biologists was sought in making a determination of the boundaries of the area which needed to remain in its natural state if the fishing, boating and other values of the area were to continue unchanged.

The major water body identified for preservation was Rookery Bay, a 1000-acre salt-water bay. Much of the area recommended for preservation was privately owned land perimeter to Rookery Bay and its smaller tributary water bodies.

Agreement was reached that total prohibition of development on privately owned lands was neither a realistic nor a proper objective.

Decision was reached that in order to insure the perpetual absence of urban development, title to the land needed to be vested in a public or institutional organization which could hold the lands in trust in perpetuity for specific conservation purposes.

The only feasible way of acquiring title to the lands was through purchase. Agents for the Conservancy negotiated a purchase price with the landowners and secured option agreements.

A fund drive was mounted and broad community support in the form of donation pledges was secured. A pledge from the National Audubon Society was obtained, in which Audubon agreed to participate in the purchase and to serve as trustee for the lands after their acquisition.

During 1966 and 1967, 2600 acres of privately owned land was purchased for $450,000. The purchased lands surround 1400 acres of state-owned water area.

The aggregate 4000-acre estuarine land and water area has now become Rookery Bay Sanctuary. Title has been vested in the National Audubon Society.

The Sanctuary is separated from the Gulf of Mexico by a narrow barrier island and is connected to the Gulf by Little Marco Pass, near the Sanctuary's south boundary.

The Sanctuary includes Rookery Bay, several small bays, numerous salt creeks and many small mangrove islands, plus a substantial amount of mangrove forest and adjoining upland.

The purpose of the Sanctuary is to permit preservation of the lands and waters within its boundary in their natural condition, in order to perpetually serve both conservation and recreation interests.

As privately owned coastal lands in the vicinity become urbanized, Rookery Bay Sanctuary is intended to remain a meaningful sample of the natural conditions which preceded urban development, a publicly accessible marine park which provides pleasure to both its users and its viewers, a producer of and host to a variety of bird and fish life.

Having successfully concluded the planned program of acquiring, and thus protecting the area within the Sanctuary from development, the Conservancy rested briefly on its laurels, feeling that the original objective of protecting the area within the Sanctuary from change had been successfully accomplished.

After the brief rest came the realization that the Sanctuary is not a self-contained ecologic unit and can be adversely affected by actions on nearby privately owned lands.

Pollution, increase or decrease of surface water flow into the Sanctuary, changes in salinity patterns, disturbance from dredging and filling in the vicinity and other modifications of natural conditions resulting from nearby activities could affect the Sanctuary's plant and animal life and thus the value of the Sanctuary itself.

It was recognized that if the Sanctuary is to fulfill its intended long-range purpose, it must somehow be protected from damage by the nearby urban development which is already beginning and which will intensify in the years to come.

Additional land purchase will not solve the problem. Regardless of how much land is purchased, there will always be a boundary on one side which is Sanctuary lands; on the other side of which is privately owned lands, subject to urban development.

There will always be interaction between the potential damaging effects upon Sanctuary lands and waters by nearby private lands.

Clearly, the need is for devising an arrangement whereby Sanctuary lands and nearby private lands are good neighbors, each avoiding damage to the other, each contributing value to the other.

Having defended the area which is now the Sanctuary against its conversion to urban lands, having spearheaded the drive to acquire and thus perpetually prevent urbanization of the Sanctuary, the Conservancy has now launched an effort to defend the valued features of the Sanctuary from damage resulting from activities on nearby private lands.

Each of the three succeeding stages of the Conservancy's activities has increased in magnitude and complexity. The third stage seemed to warrant the assistance of, and participation by, an organization which regularly deals with the conflict between natural resources management and urban development activities.

Accordingly, the Collier County Conservancy requested and received financial and technical assistance from the Conservation Foundation, a national, private, nonprofit research and education organization.

The Conservation Foundation is concerned about the wholesale conflict in the nation between conservation and urbanization.

Utilizing its professional research and educational resources, in concert with funds made available through a Ford Foundation grant, the Conservation Foundation is sponsoring a series of projects which are designed to develop ways and means of resolving the conflict between urbanization and conservation, and of building the results of its efforts into the country's urban development processes.

The Rookery Bay area conservation/urban development demonstration project is one of those which is being funded and technically assisted by the Foundation.

The Collier County Conservancy is acting as local sponsor for the project. The study area includes both the Sanctuary and the surrounding privately owned lands which are ecologically related to it.

The project work program is built around four fundamental needs:

1. Thinking through the questions which must be answered if conservation/urban development conflicts are to be resolved.

2. Undertaking the research necessary to adequately answer the questions.

3. Preparing a suggested course of action for involved landowner-investors, governmental agencies and conservation organizations.

4. Developing methods of implementing the suggested course of action.

A dual objective is sought from the project:

1. Preparation and implementation of an urban development program for the area perimeter to and ecologically related to the Rookery Bay Sanctuary, which will result in the urban area avoiding damage to the Sanctuary and the Sanctuary adding value to the urban area.

2. Determination of some general principles which will permit the project to serve as a meaningful, broadly applicable demonstration of the validity of marrying urban development practices with conservation principles.

Ann Satterthwaite, Conservation Foundation Senior Associate, is serving as project director for the Foundation. William R. Vines, Urban Planning Consultant, is serving as project coordinator-planner.

A technical team composed of both natural science and urban development-oriented professionals is contributing to the project.

The technical team has been drawn from the Conservation Foundation staff, governmental and educational institution personnel and private consultants.

The project work program is subdivided into four broad areas:

1. Ecological determinants.
    - a. Describe the area's marine and upland plant and animal life.
    - b. Determine the area's ecological functions, especially its relationship to commercial and sports fishing.
    - c. Describe what parts of the ecosystem extend beyond the boundaries of the Sanctuary, which of these must not be changed at all, which can be changed, and how much they can be changed, without causing serious damage to the Sanctuary's valued features.
2. Boundary delineation.
    - a. Determine logical boundaries of the Rookery Bay planning area by considering the need for ecosystem protection, existing urban development patterns, vacant land ownership patterns and urban planning implications.
3. Planning criteria.
    - a. Identify urban development activities which would damage the valued features of the Sanctuary.
    - b. Define urban development limitations which, if adhered to, will avoid damage to the Sanctuary.
    - c. Indicate urban development opportunities which do not conflict with the development limitations.
4. Implementation.
    - a. Analyze the economic and real estate implications of the development opportunities identified in Number 3 above.
    - b. Determine whether any Sanctuary modifications or management actions would improve and/or offer greater protection to Sanctuary values.
    - c. Outline official policy, plan and regulatory actions which should be enacted by involved local and state governmental agencies on behalf of the project objectives.
    - d. Indicate ways of mobilizing support for the project recommendations.

e. Suggest means of securing coordinated developmental action by the varied private landowners in the area.

f. Document follow-up actions needed by project participants.

The initial phase of the project is to be conducted within a six-month period, beginning November 1, 1967, terminating April 30, 1968. At the end of this period, a report will be published which documents the data assembled, conclusions reached, and recommendations formulated.

The report will cover the subjects listed in the project work program. The report will not include a specific and detailed development plan for the area, but will describe the developmental "dos and don'ts" which must be adhered to if the dual objective of guarding against damage to the Sanctuary by nearby development, and insuring that the Sanctuary increases the value of nearby property, is to be achieved.

Finally, the report will indicate the future action which must occur by involved public and private individuals and agencies if development recommendations are to become a reality.

The project participants fully recognize that implementation of whatever recommendations are forthcoming will depend in large part upon voluntary acceptance of the recommendations by landowners/developers/investors in the area.

Voluntary compliance with the report recommendations by private investors is not likely to occur unless the recommended course of action works to the financial advantage of the investor.

Each of the project participants is committed to the belief that wise natural resources management is good business; and that conservation principles can be married to urban development practices, with a resulting economic advantage to the involved private investors. Thank you.

MR. THOMAN: Thank you very much, Mr. Kuperberg, for describing a very interesting project.

We will reconvene promptly at 2:00 o'clock.

(Whereupon the meeting recessed at 12:35 o'clock p.m.)

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WEDNESDAY AFTERNOON SESSION

March 13, 1968

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The public meeting directed toward obtaining contributions from Florida interests regarding the National Estuarine Pollution Study being conducted by the Federal Water Pollution Control Administration convened in the Granada Room of the Park Plaza Hotel, Orlando, Florida, Wednesday afternoon, March 13, 1968, and was called to order at 2:00 o'clock p.m. by Regional Director John R. Thoman, Southeast Region, Federal Water Pollution Control Administration.

MR. JOHN R. THOMAN: As our first participant this afternoon, I would like to call on Professor Thomas deS. Furman, President of the Florida Engineering Society, who will represent that society, and I believe, also, Tom, you represent the Department of Bioengineering at the University of Florida.

DR. THOMAS deS. FURMAN: That's true. This is a more or less joint statement which is presented for the Estuarine Pollution Commission by the Florida Engineering Society by Professor John E. Kiker, Jr., Chairman of the Environmental Engineering Department at the University of Florida; by Professor John A. Nattress, Acting Dean of the College of Engineering; and Mr. Walter H. Kuhrt, Jr., who is President of the Florida Section of the American Society of Civil Engineers.

Except in isolated instances, the estuarine and nearshore waters of the Atlantic and Gulf coasts of Florida have, until recently, been relatively free of pollutants in sufficient quantities to impair their unrestricted use for recreational pursuits or commercial fishing.

Where pollution existed in the vicinity of large centers of populations and certain industrial establishments, the effects were usually local and relatively minor.

Exceptions to this are certain streams in Nassau County and the Fenholloway River, which was virtually destroyed in 1954.

Since World War II, the rapid increase in population, the growth of industrial enterprises and the enormous expansion of resort and recreational facilities have focused the attention of local, state and federal agencies as well as that of the general public on the problem of protecting this important natural resource from degradation.

The engineering profession, as represented by the Florida Engineering Society, the Florida Section of the American Society of Civil Engineers, the University of Florida's College of Engineering, and especially the Department of Environmental Engineering, has been acutely aware of this problem.

We would, at this time, like to compliment the Federal Water Pollution Control Administration for its efforts in initiating the National Estuarine Pollution Study and to outline some thoughts and recommendations for consideration.

Although distasteful to contemplate, it is nevertheless a fact that the oceans and their embayments are the ultimate recipients of all of man's waterborne pollutants and the degree of pollution increases in direct proportion to population density and industrial and agricultural activities.

Thus, we find ourselves on the horns of a dilemma. On one hand we would like these waters to remain in their original pristine state, while on the other, we need the waters for dilution of the waterborne wastes from agriculture, industry and our ever-expanding population.

The major problem is to determine how this natural resource can be used to the best advantage of all concerned.

Unfortunately, there is no simple procedure for evaluating the characteristics of estuarine and nearshore waters and indicate their present and future potential.

The best that can be done is to investigate their current conditions, determine as best as we can the effects of present and future pollutants and, based on this limited knowledge, establish a course of action to best serve both present and future generations.

It is, therefore, recommended that in-depth studies be initiated immediately to establish the physical, chemical and biological character of the estuarine and nearshore waters of Florida.

These studies should include:

1. The geography of the area to establish the physiographic and socioeconomic character of the tributary and/or adjacent area.

2. A sanitary survey of the area to establish the source, character and quantity of all domestic, municipal, agricultural and industrial wastes discharged into the estuary or into tributary waters.

3. The hydrology of the area to determine the amount, character and variations in fresh water flowing into the estuary.

4. The hydrography of the estuary and nearshore area to define tidal phenomena, currents, mixing, sedimentation and diffusion characteristics.

5. The physical and chemical character of the estuarine waters to determine rates of settling and degradation and to establish maximum and minimum limits of pollutants.

6. The biological character of the area to catalog existing biological flora and fauna and establish their sensitivity to changes in the physical and chemical environment of the estuarine and nearshore waters.

Few investigations are as complex and interdisciplinary in character as those necessary to establish estuarine and nearshore water quality standards. The preceding list is incomplete and includes only the major areas of investigation.

Once the baselines have been established, regulation of all pollutants entering the estuarine or nearshore waters should be initiated.

The goal of these regulations should be to protect the quality of the waters for the domestic, municipal, agricultural, industrial, recreational and other beneficial uses, both present and future, by establishing specific degrees of waste treatment needed to achieve this goal.

The establishment of arbitrary degrees of treatment without regard to the foreseeable need or beneficial use is not in the best public interest.

Financing, administration and control of the initial studies, together with the establishment of treatment parameters and the enforcement of effluent quality standards should be kept on a state and/or regional level.

Federal participation should generally be limited to provisions for specialized equipment, technical assistance and the allocation of funds on a matching basis.

Federal funds can best be used for the support of specialized research and, most importantly, for the training of personnel to staff the research and control programs on the graduate and undergraduate levels.

It must be fully recognized not only that water pollution control engineers and scientists are in short supply, but that educational institutions will be unable to turn out the quantity and quality of personnel needed unless their water pollution control programs are adequately financed.

At the University of Florida, for example, 250 student-quarter-hours are required to generate state funds for one full-time-equivalent instructor at the undergraduate level, and 100 to 125 student-quarter-hours at the graduate level.

Even though the instructional program in water pollution control at this university has the largest enrollment of any institution in the southeast, the foregoing constraint permits state support for only about one third of the faculty used in the present teaching and research program.

Fortunately, research and graduate education programs related to estuarine pollution problems have been conducted at the University of Florida for a number of years.

In 1962, the Division of Water Supply and Pollution Control of the U. S. Public Health Service (now the Federal Water Pollution Control Administration in the Department of the Interior) awarded a demonstration grant to our environmental engineering group for a study of the problems.

The project objective was designated as "a study of the physical, chemical and biological factors of a polluted and unpolluted estuary; the development of measures to evaluate the ability of such estuaries to assimilate wastes under natural and controlled conditions; and analysis of the present and potential future development of an area contiguous to a given estuary in order to use the basic scientific findings to best advantage."

The project was continued over a period of about three and one-half years under the direction of Dr. Thorndike Saville.

His final report was a meticulous distillation of a number of detailed studies made by a variety of scientists and engineers. It is believed to represent an interesting example of interdisciplinary attack on the complex problems involved in a comprehensive study of estuarine pollution.

It is perhaps unique in that it comprises studies by the same group and by similar methods on two generally comparable estuaries, one virtually unpolluted and the other heavily polluted.

In many respects, the report sets a pattern that should be useful to others undertaking similar studies. Thank you very much, Mr. Chairman.

MR. THOMAN: Thank you very much, Professor Furman. Are there any questions?

MR. PATTON: Tom, you mentioned the matter of input, to train personnel in the field. Do you have any idea how this can be increased, rather than competition of what is available?

DR. FURMAN: This is a difficult question to answer, Vince. We have been looking for this answer for quite a while. I think salaries, to some extent, are important.

I think general interest is equally important. I think you have got to create the interest among the students themselves, or else take people who are already in the field, bring them into this program, give them the additional training which they need, and then put them back into the field.

I think it's going to be difficult in many cases to bring entirely new people into the field as raw recruits, educate them and train them. I think this may be a little difficult.

MR. THOMAN: Again, thanks a lot, Tom. Well, first of all, is Mr. L. D. Lukin, from the Palm Beach Health Department, here? He apparently had to leave, and his statement will be incorporated in the record.

(Audience indicated Mr. Lukin had left his statement.)

MR. THOMAN: We will get it and see that it is incorporated in the record.

I would next like to call on Jack Spratt, Chairman of the Water Resources and Water Control Committee, Florida State Chamber of Commerce.

MR. JACK R. SPRATT: Mr. Chairman, ladies and gentlemen: My name is J. R. Spratt. I am Chairman of the State Chamber of Commerce Committee on Water Resources and Water Control.

As representative of the Florida State Chamber of Commerce, Committee on Water Resources and Water Control, I am pleased to present for consideration by the Federal Water Pollution Control Administration some comments pertaining to the use of, and orderly development of, the many estuaries in the State of Florida.

A large number of estuaries are traversed by navigation channels utilized by deep draft and shallow draft shipping.

Many of these channels are authorized federal navigation projects, constructed and maintained by the United States. In addition, most estuaries are subjected to heavy use by recreational craft.

Throughout the state, a large number of thermal plants for generation of electrical power are located on estuaries. Water of the estuary is used for essential cooling operations in these plants.

It is expected that such use will be continued in the indefinite future and that to this cooling water requirement will be added the even larger requirement of cooling for power plants using atomic energy.

The estuaries of Florida provide the receiving channel or body of water for the run-out of major floods from Florida's many rivers. Channel improvement is being, or has been, carried out in a number of these estuaries to provide needed flood capacity.

An illustration of recent activity of this character is the dredged channel in McKay Bay at the lower end of the Tampa By-Pass Canal to provide for handling the design flood of the Hillsborough River, a part of the Four River Basins Project for flood control and water resource development.

An important function of Florida's estuaries is to provide a suitable nursery ground for many species of marine life forming an important part of the food chain for Florida's fish.

Commercial and sports fishing in the estuaries, the Atlantic Ocean and the Gulf comprise a very important part of the overall economy of this state.

The use of our estuaries for such purposes as mentioned represents an important part of the overall economy of our country and state and will continue.

While current practices may have to be altered, we feel that little is known with respect to many of the complicated problems involved.

Arbitrary rules and regulations, based on opinions, rather than scientific support, could be extremely dangerous in that such action could result in undue hardships on certain important segments of our economy.

This could very well happen with little or no worthwhile results. Therefore, until definite information is available as to what may constitute reasonable practices, we respectfully urge that caution be used in imposing rules and standards governing use of these estuaries.

I appreciate the opportunity to appear before this meeting. Thank you very much, ~~Mr. Spratt~~.

I would next like to call Mr. J. H. Herbert, Jr., Extension Conservationist at the University of Florida.

While he is coming up, I would like to indicate for the record that the Committee of 100, Hollywood, Florida, will submit a statement for the record.

MR. J. H. HERBERT, JR.: Panel, Senators, distinguished guests, ladies and gentlemen of the press: The Institute of Food and Agricultural Sciences, University of Florida, includes the College of Agriculture, School of Forestry, Florida Agricultural Experiment Stations and the Florida Agricultural Extension Service.

The Division of Biological Sciences includes, in addition, the Departments of Zoology and Marine Science and coordinates the biological sciences throughout the university, including the Colleges of Medicine and Engineering.

All of these sections of the University of Florida are vitally concerned with the optimum food production and growth of agricultural industries, the preservation and best use of natural resources, and the development of recreational potentials within the state.

We are, therefore, concerned over the pollution, or potential pollution, of estuaries. Our special research interests include:

1. Effect of industrial wastes and the influence of different types of industrial wastes.

2. Sewage waste disposal, including detergents.

3. Human and animal wastes.

4. Agricultural wastes -- pesticides and fertilizers.

5. Soil and water management practices.

6. The net economic effects of pollution control.

7. Estuarine ecology -- microbiology and nematology.

Staff members are conducting research in all of these areas with limited resources. In most instances, research is concerned with the advantageous use or reduction of these wastes.

In other instances, investigations center on the ecological effects of the wastes.

Basic knowledge is woefully lacking in regard to:

1. The amount of waste material entering specific estuaries.

2. The changes in the estuarine environment which may result from various increments of different types of wastes, individually and in combination with others.

3. The characteristics and best use of given estuaries.

4. The productivity of given estuaries with and without introduction of known quantities of wastes.

5. The role of marine organisms in the removal or degradation of wastes.

6. The potential use of wastes for controlled food production in estuarine zones.

7. The microbiological and chemical safety of foods grown in areas of effluent sewage and then purged in clean areas.

8. The kind and amount of pollution control which maximizes society's net returns to the control measures when all effects, both internal and external, are considered.

The Institute of Food and Agricultural Sciences and the biological sciences have extended capabilities to develop information and action programs with respect to estuarine pollution and the best use of these resources.

Since the widespread use of pesticidal products was begun, IFAS, especially the Departments of Entomology and Nematology, Food Science, Soils and Agricultural Engineering, have been continuously involved in research and educational programs on their proper use.

In fact, during the past six years, safety in the use of agricultural chemicals has been stressed as a very important part of our extension program.

It has been so successful that Florida has been recognized as being a national leader in this effort. Particular emphasis has been placed on the problems resulting from such acts of carelessness as direct aerial spraying of open waters by planes, washing of spray equipment in lakes and streams and dumping of old materials or containers into lakes and streams.

The Department of Agricultural Economics has research currently under way which will develop an empirically estimable model for use in evaluating the social welfare effects of the agricultural use of pesticides.

The competence acquired from this effort will be valuable in a similar analysis of pollution control in estuaries.

Studies on the microbiology of the estuarine environments have been in progress in the Department of Bacteriology since 1965.

Studies have emphasized the characterization of unusual microbial forms recovered from estuaries, the development of methods for the study of estuarine microbiology and the evaluation of organic turnover in heavily polluted estuaries.

These limited studies could be readily expanded and contribute significantly to an understanding of the general characterization of Florida estuaries.

The President's Science Advisory Committee on World Agriculture concluded that food consumption and production in the developing world will have to grow at approximately four percent annually over the next 20 years to meet critical nutritional needs.

This target requires an investment in agriculture that appears unlikely. Therefore, it is essential that we explore alternative means for providing these food supplies.

A prime alternative with considerable importance to Florida's growth is the development and management of the major estuaries and contiguous continental shelf.

It is of great importance, at this time, to evaluate the existing characteristics of the Florida estuaries to define existing conditions and to serve as a base of comparison for evaluating changes when they occur.

The techniques for the evaluation of estuarine conditions are not well established, and the salinity of these environs makes difficult the direct application of methods useful in the evaluation of fresh waters.

The Institute of Food and Agricultural Sciences has a statewide group of researchers devoting their efforts to food and agricultural industries.

The expertise and research laboratories of the Institute of Food and Agricultural Sciences, the Biological Sciences and the University of Florida can contribute significantly to an evaluation of the estuaries and we wish to participate in a comprehensive program for the preservation, use and development of estuaries.

Respectfully submitted, J. H. Herbert, Jr., Extension Conservationist for Dr. E. T. York, Jr., Provost, Institute of Food and Agricultural Sciences, and Dr. George K. Davis, Director of Biological Sciences.

MR. THOMAN: Thank you very much, Mr. Herbert.

MR. WAKEFIELD: John, do you have a methodology for evaluating the benefits of reducing pollution in an estuary below a critical level to one that would produce fish and live things of this sort?

MR. HERBERT: It's my opinion, but it's a matter of fact, that the expertise gained from the work under way of Dr. Max Langham, while not specifically applicable, will not necessarily require so much time, but is dependent on empirically estimable models which will have equal application in both fresh and salt waters.

Mr. Chairman, with your permission, and in the interest of your time schedule, I would like to present for the record an additional statement from the American Institute of Chemists.

MR. THOMAN: We will accept it and incorporate it into the record.

MR. HERBERT: Thank you.

MR. THOMAN: Since this has been a stag affair all day, I would like to call on the President of the Florida State Division of the American Association of University Women, Mrs. Branan.

While she is coming forward, I would like to note for the record that a statement will be filed for the Florida Gas Transmission Company, Winter Park, Florida, by Mr. R. Y. Patterson, Jr.

MRS. LEE F. BRANAN: This is a rare opportunity just to talk to a group of men. I am accustomed to talking to women all the time who belong to the American Association of University Women.

You might be wondering just why I am here in the interest of estuarine pollution, since I live in Ocala, Florida, which is in the central part of the state.

The reason I was invited to make a statement is that I am the Florida State Division President of the American Association of University Women. Our organization is definitely interested in water pollution.

At a state convention held in October, 1966, the delegates, representing a membership of 4100 women, passed the following resolution:

WHEREAS, air and water are necessary for all life, be it plant, animal or human, and

WHEREAS, the happiness, health and well being of untold numbers of American citizens and of living flora and fauna have been shown to be endangered by contaminants present in the air which they breathe and in the water which they drink or inhabit, and

WHEREAS, offensive pollution in outdoor atmosphere and in water may be controlled or reduced to nondeleterious percentages by technical or diverse procedures, and

WHEREAS, federal and state legislation and/or measures now extant or under consideration are presently of prime importance to removal or control of atmospheric or water pollution, and

WHEREAS, the Federal Water Pollution Control Act, Public Law 660, provides that states must, after public hearings, adopt appropriate water quality criteria for interstate waters prior to June 30, 1967, and must present an implementation and enforcement plan pertaining to said criteria, therefore

BE IT RESOLVED, That the Florida Division of the American Association of University Women urge the Governor of Florida, the Florida State Board of Health and the Citizen's Advisory Committee on Water Quality Control to take prompt action to effect maximum control of water and air contamination.

One of the primary purposes of our organization is developing our own intellectual growth. This means that we have a large number of study groups throughout the state working on timely topics.

I would certainly call water pollution one of these topics. We have 35 branches scattered over the state, and many of them are either on the east or west coast.

There are definite indications that water pollution is a growing concern among the members of these various branches.

We are interested in conserving the natural beauty of Florida and promoting community projects to keep Florida clean and healthy. That means we are interested in prevention of water pollution in all areas.

The various Branches of the Florida Division of the American Association will need to know where they can obtain information to use in their special interest study groups.

I know where we can write for booklets and copies of bills that you have on display here today, as I secured my copies last week; but what I want to know is where we can obtain such information concerning water pollution which has been described here during this meeting.

We want to become better informed ourselves and in turn help to inform others.

At our state convention last fall, a committee was appointed to contact other women's organizations throughout the state to find out how many and which ones would be interested in forming a Florida Legislative Forum or Council.

The state presidents of several organizations are presenting the idea to their boards, and the results are very encouraging. They are definitely interested in this project.

It is proposed that this Forum, or Council, whichever they decide to call it, would consist of a number of women's organizations and would meet weekly in Tallahassee during the regular session of the Florida Legislature.

Four or five representatives from each organization in the Forum would attend the weekly meetings to obtain information on certain bills to relay back to their own groups and members.

The weekly meeting would last one day or a half-day as needed. A member of the Legislature would be asked to speak to the group each week and the rest of the time would be given to hearing reports from the bill sorters who have studied the bill and can tell us the answers to some of these questions: Who is for the bill? Who is against it? Why? What progress is it making? When do they think it might reach the floor of the Senate or House?

In making this report, under no circumstances are they to show any partisanship. It is to be a job of reporting only by the bill sorters who are members of the Forum.

The Florida State Division of the American Association of University Women stresses study before action. We do hope to be of some help in eliminating estuarine water pollution in our wonderful state.

Thank you very much for inviting me to come and attend this very worthwhile and informative meeting.

MR. THOMAN: Thank you very much, Mrs. Branan. For your information, any time you need any information, you may write us, or I'm sure you can write Mr. Patton of the Florida Air and Water Pollution Control Commission, and he will be happy to furnish anything that is available.

MRS. BRANAN: Thank you very much.

MR. THOMAN: I would next like to call on Ralph Peterson from the Sebastian River area of Brevard County.

MR. RALPH PETERSON: I am Ralph Peterson from the Sebastian River area of Brevard County, and my big job is being retired, and, of course, interested in the pollution of our area.

For your information, we wish to discuss water pollution as it affects the Sebastian River area. We feel that in this particular area we are well qualified to speak.

We live here and collectively we know every foot of this area. We know where the pollution comes from, and the causes of our pollution problems, but not the preventative measures that would solve our problems.

As for other areas, we don't feel qualified to speak on their problems; however, we feel that contributing factors we are plagued with apply to many other sections of our coastline.

Facts that are brought forth in this paper we hope will not be swept under the rug, but brought out in the open and given sober consideration.

In the spring of 1963, the North Fork of the Sebastian River and that part of the river from the confluence of the North and South Forks to well out into the Indian River, experienced a fish kill that completely destroyed all fish and crabs.

Fish lay in windrows along the shores of the river. Alarmed residents held a meeting, and the Sebastian River Area Inlet Conservation Club was organized.

With the help of the State Board of Health and their portable laboratory, the source of the pollution was traced to the Okeelanta Sugar Mill at Fellsmere.

The management of the sugar mill was contacted and agreed to work with us in correcting the conditions causing the pollution.

Sugar cane was being washed before being crushed; all water used in this operation ran into a canal, which, in turn, emptied into the North Fork, carrying the insecticides, herbicides, fertilizers and residue on down to the Indian River.

The sugar mill submitted a plan on the installation of settlement basins and a series of pumping stations which was approved by the State Health Department engineers.

Over 400 acres were devoted to this project and through the cooperation of the Okeelanta Sugar Company, the solution of our problem was found and corrected.

Now, the water pumped or drained into the settlement basins is used over and over several times for irrigation, thereby getting the full benefit of all fertilizers and insecticides that would otherwise have been flushed into the river.

Since this case of pollution of the Sebastian River occurred, the Okeelanta Sugar Company has converted their operations from sugar to citrus, which could be even more of a source of pollution, especially if a citrus processing plant should be installed.

The foregoing has been explained in detail and has no bearing on our present problem, but is submitted as an example of what can be accomplished when industry and local conservation groups work together.

We ask you to stand on the State Road 512 Bridge over the Sebastian River and look to the south and west. In a large pasture you will see several hundred head of dairy cattle.

This pasture adjoins the Sebastian River which is the recipient of all the manure deposited by these cattle. We have read that a mature cow will produce as much as 16 times the amount of bacteria as a human.

At this ratio, the cattle would compare to a city of several thousand people on the banks of the Sebastian River without the advantages of even the most primitive of sanitary facilities.

The dairy itself is a model of cleanliness. The floors are flushed and cattle washed with water, which is drained directly into the Sebastian River.

For several miles on each side of the confluence of the Sebastian and Indian Rivers, the Health Department has closed the estuarine waters to all shell fishing.

This is due to the contaminated waters flowing out of the Sebastian River. After one inch of rainfall is registered, all shell fishing in the approved areas of Brevard County are closed until after water checks are approved as having a permissible amount of bacteria.

Now, this could not be due to septic tanks, which are used as much in dry weather as in wet. When we have a hard rain, the run-off carries the manure, fertilizers, insecticides, herbicides, et cetera, into our creeks, canals and rivers, directly into our estuarine waters.

We are aware that there are some improperly installed septic tanks. We are also aware that some should be replaced. These are individual cases that should be handled as such, but let's not point the finger of guilt at all septic tanks.

They do not contribute but a small percentage of the pollution that is pouring into our estuarine waters from our ranches, groves, farms and dairies.

Some time ago, our county commissioners came up with a ruling whereby at least one acre was required for a building permit where a well and septic tank were both necessary.

This included recorded subdivisions that had been in existence for years. Some subdivisions had been approved prior to the ruling, that any layman should never have approved, certainly no one that had the responsibility of safeguarding the public health.

However, the commissioners put everything in Brevard County in the same category. We are happy to say they have now relented and each case is judged on its own merits.

We know that regardless of pollution problems, we must have our dairies, groves, ranches and farms. They need help in solving this problem, but we do feel that this is a problem which needs solving and should be openly considered and discussed.

It will not disappear by ignoring it. Thank you.

MR. THOMAN: Thank you very much, Mr. Peterson.

I would next like to call on Ben Franklin from Winter Park, Florida.

MR. M. (Ben) FRANKLIN: Mr. Chairman, ladies and gentlemen: I don't know who is doing any favor by getting me up here, but I came here yesterday and I heard all these professors, and everybody who was here was giving me all this information about pollution.

Now, I guess most of you people have heard about Ben Franklin. My name is Ben Franklin, without the kite.

Pollution is one thing, and I am very much interested in pollution. But when you talk to the little man that is sitting on the bank fishing, he don't know pollution from borsch.

He wants to know where those fish are. Ladies and gentlemen, this is what I want to know. I want to know where those fish are. I don't care whether they boil them in Dade County, whether in Jacksonville they have got sewage or whether along the coast they do something else and spill oil.

We have a lot of things in this state we have to look into, and as a man that has laid in bed ten years and who has thought about the outdoors as much as I have, believe me, if I make any remarks that are out of line, it's just because I am trying so hard to try and keep this great state in some sort of order with regard to game and fish.

Some months ago, after about ten years of bugging the Game and Fresh Water Fish Commission about bringing exotic animals into this country to fill up the uninhabitable areas rendered uninhabitable by man, I put out a little handbill at my own expense, which I have paid all the time through this, about exotic animals, and it seems that your great Governor caught on quick.

One of the first folders I put out quoted the Governor where he said "The Game and Fresh Water Fish Commission should continue its program of experimenting with nonnative game and fish in an effort to locate and establish species that will supplement our fish and game."

And I followed on this with a loud Amen. I know we are here on a pollution deal, but animals have to eat and they have to drink. And that great Everglades, which, since I have been in Florida, God is willing, will allow me to get down with the Indians, and believe me, we have a God-given country here.

(Remarks off the record)

MR. THOMAN: Mr. Franklin, these remarks don't seem particularly germane to our subject.

MR. FRANKLIN: I admit that, sir, and I was told that, and I was asked about this, and was told to come up.

MR. THOMAN: I would like for you to keep to the point of estuarine pollution. Mr. Crites, if you will, please strike from the record Mr. Franklin's previous remarks.

MR. FRANKLIN: Let me get one point across. Pollution is one thing, and where fish don't show up is the same thing. All I'm interested in as a conservationist is where are the fish.

That's all, and with that -- well, I guess I have said too much already. But just give me the fish.

MR. THOMAN: Thank you, sir. Next I would like to call on Mr. E. L. Addison, from the Gulf Power Company, with headquarters in Pensacola, Florida.

MR. E. L. ADDISON: My name is E. L. Addison, and I am Vice-President of Electrical Operations of the Gulf Power Company, with headquarters in Pensacola, Florida.

I am here today to represent my company, which is an electric public utility engaged in the generation, transmission and distribution of electric power to the public in the northwestern portion of Florida.

It owns and operates steam electric generating facilities, together with high-voltage transmission lines between those plants and the facilities of neighboring utilities, and with distribution facilities for the furnishing of electric service throughout its operating area.

The company owns and operates generating plants in Escambia, Bay and Jackson Counties, Florida.

A modern design steam generating plant must have large quantities of cooling water for its main surface condensers. Such cooling water is not consumed, but is returned to the source from which it came, unchanged in quality except for some change in the temperature thereof.

Change in temperature of cooling water is quickly reduced, as the heat is rapidly transferred to the environment after the cooling water leaves the condensers.

A major design consideration for a steam electric generating plant is that adequate cooling water be present, and that the plant, when operated, will not raise the source temperature of the cooling water, since the thermodynamics of condenser design requires that the cooling water temperature be as low as possible in order to promote the more efficient operation of all of the generating units.

Our company, therefore, has an interest in maintaining as close to normal as possible the temperature of the source of its cooling water.

Gulf Power Company realizes and fully appreciates the need for the preservation of estuarine waters as free as possible from all sources of pollution and supports governmental endeavors to achieve this result.

During all of the years of its operations of steam electric generating plants, there has not been any evidence of damage to aquatic life which may have occurred by reason of thermal change made by those plants in its sources of cooling water.

At each steam plant, cooling water is drawn from adjacent rivers or bayous and pumped through condensers. In this process, heat is absorbed by the cooling water and the temperature is raised.

This cooling water then flows into a discharge canal. This long, wide canal affords considerable surface for this water, through radiation, so that while in the canal, the water gives up much of its increased temperature to the atmosphere.

Upon leaving this canal, mixing occurs with the main body of the river or bayou where the temperature is further reduced both through the mixing and dilution process and radiation.

Gulf Power Company must carry out its public obligation, as virtually the only supplier of electric energy for that portion of the state in which it operates, and doing so involves the most economical and efficient steam plant operation consistent with the preservation of, insofar as possible, the natural state of the waters which it uses in its generating processes.

The public's requirements for efficient and economic electric service must be considered in evaluating the respective benefits of estuarine waters on the one hand and the availability of electric energy for a modern society on the other.

The company does not believe that there need be a conflict between these two objectives, and it further believes that its operations satisfy both.

Use of estuarine waters for cooling purposes in steam electric plant generation is a customary and legitimate use of these waters.

As I have stated, we know of no case of damage or injury to aquatic life by reason of our plant operations, and likewise, there has been no impediment to the use of these waters for recreational or other purposes as a result of our plant operations.

Thank you very much, Mr. Chairman.

MR. THOMAN: Thank you very much, Mr. Addison, for being patient with us over the last two days.

At this time, I would like to call on Arthur Finney, President of the Florida Pollution Control Association, Miami, Florida.

MR. ARTHUR R. FINNEY, JR.: First of all, I would like to say that the Florida Pollution Control Association is made up of members representing the water pollution control plant operators, manufacturers' representatives, federal and state regulatory agencies, educators, engineers and other persons interested in the field of water pollution control.

Since our inception in 1940, members of this Association have been active in correcting the pollution problems existing within the State of Florida.

We welcome the sudden interest in water conservation that is taking place as a result of federal laws passed in 1965 to clean up the streams and bays of our country.

It is good to see these newcomers with unlimited funds for corrective measures, since we have operated so many years on a very limited budget with an insufficient number of personnel.

In the passage of the Water Quality Act of 1965, Congress thought that it was wise to permit the states to set water quality standards for their streams and correct pollution problems before the federal government took action.

All of us here today know that Florida has enacted an active pollution control program through its Air and Water Pollution Control Commission and the Florida State Board of Health.

It is believed that again it would be wise for the states to plan the use of these newly found recreation areas that have become available as a result of removing the pollutants.

Therefore, we feel that the Department of Interior, in their report to Congress, as required under the Clean Water Restoration Act of 1966, recommend that the states be given the job of determining the optimum use and future development of estuarine resources.

One member of the Executive Board of the FPCA was quite concerned at the number of federal and state agencies involved in the water conservation and resource programs in these United States.

In the January, 1968, issue of "Water and Wastes Engineering," nine pages were used to list the federal and state agencies associated with these programs.

Of the nine pages, two and one-half pages listed federal agencies. It is felt that the federal government should first reevaluate its part in these programs and decide what Cabinet post is to be responsible for water resources and conservation.

I am sure that the average citizen is completely confused when he reads the number of agencies presently involved.

Somewhere along the line, it is felt that lawmakers should stop and review the situation at hand and determine who is going to pay for all these programs. Quite too often these individuals are persuaded by pressure groups to enact laws, when the legislators have only the vaguest opinion and ideas on the subject.

There is no doubt that all the streams within this country can be returned to their natural state if funds are made available. Industry can correct their conditions and pass all the cost of these corrections to their users.

The federal, state, county and city governments can provide moneys collected through taxes to enforce and administer these programs and even furnish money for treatment facilities.

However, it is the taxpayer or the user who is going to pay for all of these corrective measures, and somewhere along the line, it should be determined how much the average man is willing to pay.

There is no simple solution to the problem at hand, but we recommend that the use of its water should be determined by the state.

We further recommend the federal government decide on one agency to administer all water resource and conservation programs, and, in turn, this agency work with the state only when necessary.

Efforts should be taken into consideration to determine where the moneys are to come from to enact such a program and determine if the average citizen is willing to be taxed more for the benefits he is to receive. Thank you.

MR. THOMAN: Thank you very much, Mr. Finney. I believe, according to one of the recent amendments to the federal law, we are required on each January 1st to submit a report to the Congress on the costs of clean water.

The first, and admittedly imperfect, report was submitted to the Congress on January 1st of this year. We are soliciting comments from all interested people, and neither Mr. Berkowitz or Mr. Patton have given me their comments yet, but the complete report is now available, and hopefully, if you will comment, we will deeply appreciate it.

This is an attempt to tell the public what it is going to cost to give them the alternatives.

MR. FINNEY: I think that is important.

MR. THOMAN: Yes, the Congress felt it was very important, too.

Next, I would like to call on Dr. Hugh Putnam, representing Reynolds, Smith and Hills, Jacksonville, Florida. Dr. Putnam.

While he is coming up, I would like to indicate for the record that a statement has been submitted by the Orange County Commission, signed by J. C. Cooper. I presume he is Chairman of the Commission.

Okay, Dr. Putnam.

It is mandatory that those who are responsible for preservation for our estuaries must utilize the available technical talent to the maximum extent possible.

As previously mentioned, research and development of new information should be the role of the federal government and universities. Management of estuarine basins is another government function.

Most of the people knowledgeable in estuarine matters are in the government or university system. There is, however, a large reservior of potential talent which, if properly used, could provide an extremely valuable service.

We refer to private consultants whose basic approach is:

1. To develop background information to define the client's problems

2. To devise several alternatives to solve the problem

3. To study each alternative to determine its adequacy and cost

4. To recommend to the client the most desirable approach based on the definitive information developed during the study

5. Implement the recommendation.

This procedure can be of significant value to business, industry and government in proper planning of estuarine development. A large number of consulting firms are not knowledgeable in the technological and economic problems of estuarine management.

It seems reasonable to expect that the federal government and the public at large might reap significant benefits from a federal programs aimed at providing specific professional training in estuarine matters for private consultants.

This group could then utilize their basic training in this new field to assure the proper development of our estuaries. Thank you, Mr. Chairman.

MR. THOMAN: Than you very much, Dr. Putnam.

MR. TRAINA: The last statement you made, concerning training, do you envisage a whole curriculum, a whole program, in terms of training engineers, scientists and technicians in the areas of estuarine management control?

DR. PUTNAM: I wouldn't envisage a whole program. I would envisage very specific courses or a specific short course developed, highly intensified in this area to acquaint private consultants of the problems -- I'm sure they are not acquainted with them now -- so that they can adequately take their place in this important field.

Many instances have arisen in which landfilling practices have threatened riparian rights. Adequate regulations must be provided to control this type of activity so that it can be directed toward serving the best public interest.

Often an innovation is proposed which has a side effect that is judged to be totally bad. With the proper application of ingenuity, many of these side affects can be converted to beneficial uses.

For example, with the next decade, rising power requirements for our population will necessitate extensive thermal loading of our estuaries. Already plans are under way for the construction of a nuclear plant at Turkey Point which will release heated effluent into Biscayne Bay.

Other nuclear-fueled plants will be needed in the future to provide the necessary power for Florida. Recent trends show that on a national scale, the electrical demand doubles every six to ten years, and, therefore, by the year 2000, there will be a 30- to 256-fold increase in electrical needs.

To meet the demands for cooling waters for this extra power plants are being located in estuarine environments.

However, waste energy flowing to the estuary should be rechanneled toward a useful purpose, such as food production. Imaginative concepts already have been proposed at the Chesapeake Biology Laboratory in Maryland, where waste recycling is carried through an estuarine food chain to a level where man can profitably enter the cycle and benefit from it.

We can no longer afford the energy loss to the sea from our land via unused wastes, when the way is open to recover and rechannel this energy to man's benefit, rather than to his detriment.

We propose that the proper development of our estuaries must begin with management programs for each esturaine basin.

A proper balance must be maintained in all of man's activities, such as his urban developments, his industries and his agricultural endeavors, such that the integrated waste residues do not adversely affect the estuarine resources.

The opportunity for estuarine planning on such a scale offers a rare challenge in safeguarding our environment. Management of estuaries should be a governmental function.

The federal government should participate in the program of estuarine management through training personnel to carry out these essential tasks and conducting and supporting research.

In the early development of any complex technological field, such as estuarine management, there is a shortage of expertise and a general unawareness of the nature and extent of the problem by the general public.

DR. HUGH PUTNAM: Mr. Chairman, this is a statement presented on behalf of Reynolds, Smith and Hills, Jacksonville, Florida, and Environmental Engineering, Gainesville.

The future direction with regard to Florida's estuaries is quite clear. These magnificent ecosystems so important to the state may be expected to undergo significant environmental alteration as population rises along coastal areas and urbanization becomes manifest.

Now in the time to formulate long-range goals relating to the multiple usage of Florida's vast resource.

Bold estuarine management programs are needed and must be formulated now not only to restore grossly polluted areas, but also to strike a balance among commerical, industrial, municipal and recreational demands for the most effective and beneficial uses of inshore and marine waters.

Significant ecological stresses are being placed on these coastal embayments, because, as with our great fresh-water resources of lakes and streams, estuarines are the products of the activities which take place withing their drainage basins.

Estuaries filled with wastes comprising not only organic materials, but the residues of our highly technological society, including chemical and nuclear wastes, reflect a deteriorating environment.

Clearing of land of its vegetation and building houses, shopping centers and other structures increases land drainage into estuaries and thus contributes to their siltation, as well as to their nutrient enrichment.

Estuaries acting as nutrient traps biologically recycle the products of urban land drainage and unwanted pesticide residues and other injourious chemicals. These wastes are returned to man through consumption of edible estuarine fin and shellfish.

The coastal regions of our state invite the most rapid population growth. As a result, land has become quite scarce. Major segments of our shallow bays are being filled in for urban development, port facilities and industrial sites.

This practice will undoubtedly continue. Without adequate planning and control of such developments, the entire ecosystem of estuaries can be disrupted or destroyed.

MR. TRAINA: Do you think that through the vehicle of seminars, this type of thing -- they could be sponsored by government, state or federal -- would this helpful?

DR. PUTNAM: I think this would be very helpful in the beginning. I would foresee a further development of this as to the initiation of technical training, specific training, and course work or laboratory studies for these people.

MR. THOMAN: We have made a limited start in this direction with various short courses. Although it be limited, there is one to be conducted in April in Florida on biology of estuarine environment.

DR. PUTNAM: Yes, I am aware of that.

MR. THOMAN: It's a very good suggestion, Dr. Putnam, and we will certainly take it under consideration.

MR. PATTON: I would like to ask Dr. Putnam one question. He mentioned grossly polluted areas. I want to know what his definition is of "grossly polluted areas," and if he has any in mind in the State of Florida.

DR. PUTNAM: I haven't, Mr. Patton, a specific definition myself. More of the time, I guess, right now, rather than in citing any technical information, I would rather look at the aesthetics of the situation.

Some of the areas, such as were outlined in the report -- Professor Furman indicated in the Fenholloway River area -- I would consider that grossly polluted.

Now, I do not recall the actual levels of pollutants in that area, but I certainly would pick that as one.

MR. THOMAN: Thank you. I would next like to call Herbert R. Savage, Florida Association of The American Institue of Architects Coral Gables, Florida.

MR. HERBERT ROSSER SAVAGE: Thank you, gentlemen. Rather than read my entire statement, I am going to read the goals and recommendations that I have outlined.

I will present my entire statement to Mr. Thoman.

MR. THOMAN: Thank you very much, and this will be incorporated into the record.

MR. SAVAGE: The destiny and development of Florida estuaries will not be realized until goals are defined. These public goals should be set to provide over the next 25 years or more, a region of carefully managed landscape and soils, well-regulated streams supporting an abundance of wildlife and fish, of urban and recreational development that will meet both the needs and the hopes of its residents and visitors throughout the state.

To achieve these goals, we must consider the application of principles.

1. Provide cities, industries, farms and recreation areas with water.

2. Control disposal of sewage, industrial wastes and sediment so as to maintain clean water.

3. Diminish the hazards of floods and the consequences of drought.

4. Maintain farm land and forests to assure continuing productivity and landscape protection.

5. Identify and preserve for future use sites for new towns, dams, recreational areas and transportation arteries.

6. Protect and conserve wildlife and its habitats.

7. Preserve all important physical manifestations of the state's historical heritage.

8. Promote land use compatible with the opportunities and constrains inherent in the landscape.

9. Provide adequate open space within walking distance for all urban and suburban residents.

10. Insure planned vistas throughout the region, unmarred by eyesores and with new structures designed in a harmonious relation to landscape.

The Florida Association of the American Institute of Architects strongly recommends to your department its services in establishing an interdisciplinary task force to study ways and means of maintaining clean water, protecting the natural beauties and providing adequate recreational facilities.

The assembly of such a distinguished planning team, with a long and careful look within the state, would yield bold, balanced, far-sighted solutions to the man-made problems.

This recommendation is by no means a new idea, as you are well aware of the recent study, "The Potomac -- A Report on Its Imperiled Future and a Guide for its Orderly Development," prepared for the Department of the Interior by the Potomac Planning Task Force assembled therefore by The American Institute of Architects at the request of Secretary Udall.

This recommendation is believed by the Association to be the most orderly procedure in developing a singular plan of action to cure the pollution of Florida estuaries. Thank you.

MR. THOMAN: Thank you very much, Mr. Savage. Those are very interesting ideas that you presented there.

I would next like to call on Mr. Rebikoff, President of Rebikoff Products. Mr. Rebikoff.

MR. DIMITRI REBIKOFF: A direct measurement of water pollution is provided by the photographic record of the underwater distance of visibility, which is controlled by light scattering and absorbtion caused by solid matter in a colloidal suspension.

A general area survey is best provided by aerial photography -- color aerial slides of typical estuaries are presented -- while a detailed record of the pollution factors should be provided both by sampling for later laboratory analysis and also much faster and economically by "in situ" modern underwater stereo microphotography, now being developed by us for general oceanographic plankton survey work.

We are sad to report that several Florida estuaries do appear to be quite polluted. A rather amazing fact, in view of the very short period of settlement in this booming and beautiful frontier state, is this report.

We have to schedule almost all of our photographic research work in the Bahamas -- New Providence and Freeport already are substantially polluted -- out in the Gulf Stream.

The most typical feature of man-made pollution, as opposed to natural silt and plankton-caused marine turbidity, is that much of it floats on the surface of the heavier and clear salty ocean water, usually in a brown or yellowish layer a few feet thick.

This is especially typical of freshwater-based raw sewer effluent coming either from offshore sewer outfalls or polluted river tributaries.

This fresher polluted upper layer does not mix with salt water and is normally blown back to the beaches by the daytime good weather sea breezes -- or also, the tradewind in southeast Florida -- with the highest accumulation of solids and bacteria right against the beach in the surfline, where all the small children are happily splashing in water sometimes more contaminated than in a street gutter.

The shallower the estuary, the more polluted its shores, the more concentrated the pollution becomes.

In view of the major role played in Florida by bathing, swimming, boating and fishing, we do recommend that a correlated aerial and underwater survey of the estuarine and beachside waters be undertaken all around Florida, with a complete identification and percent concentration figure of all major pollution including bacteria under federal and state sponsorship, because one single municipality or individual just can't undertake such a general kind of exploration.

MR. THOMAN: Thank you very much, Mr. Rebikoff. Do you have any questions?

MR. TRAINA: No.

MR. THOMAN: I would next like to call on Jack Salmela, President of the Florida Anti-Mosquito Association.

MR. JACK SALMELA: I am President of the Florida Anti-Mosquito Association, and if I speak about Brevard County, I am speaking as Director of the Brevard Mosquito Control District.

When you think of mosquito control, what is the one thing that comes to your mind? You most likely think of insecticides. And when you think of insecticides, you think of something undersirable.

Since pesticides receive so much attention in regard to pollution of water, I would like to say a few words about the history of mosquito control in Florida.

Mosquito control made its greatest expansion shortly after World War II. During the war, DDT was perfected and used extensively by the armed forces.

In Florida, some of the military bases in the coastal areas used airplaines for sprying with DDT to provide relief from swarms of salt-marsh mosquitos.

The mosquitos were so bad that the military felt justified in spraying much of the surrounding residential areas as well, and the results were nothing less than fantastic.

So when the war ended and the bases began to deactivate, the mosquito control districts had no alternative but to purchase surplus airplanes and continue the spraying.

We not only sprayed the residential areas, but attacked the mosquitos in the breeding areas as well. It is more efficient to distroy the mosquitos while they are concentrated in the larval stage than it is after they have dispersed as adults.

DDT was so effective until there was hope of eradication of the mosquitos. However, our hopes were short lived. We were not heroes for very long.

Unless more attention is given to the estuarine zone, the deep-sea diver might not have the abundance of marine life he enjoys on the continental shelf today.

I personally do not know of any mosquito breeding in the estuarine zone in Florida that is caused by pollution. However, pollution in a freshwater habitat is another matter.

The mosquito "Culex quinque-fasciatus" thrives on pollution. Blind mosquitos are breeding in certain brackish waters because of the nutrient from sewage-treatment plants; and I could give a first-hand account of what the effluent does to an oyster bed, but there are others here that are more qualified to talk on that subject.

The problem of blind mosquitos could possibly become much worse, because some species tolerate a great deal of salt.

Of course, pollution is not the only problem that adversely affects the estuarine zone. The effects of dredging and filling are well known, and damming is another.

Mosquito control has constructed dikes around many thousands of acres of salt marsh, and even though our work has been of tremendous benefit to most forms of wildlife, our dikes undoubtedly interfere with free passage of marine organisms.

We desperately need information on how to manage our mosquito control impoundments with the least damage to marine life.

It is much easier to prevent a problem than it is to correct one. Every effort should be made to stop the spread of Urasian Milfoil. This weed is already established along the west coast of Florida and is spreading rapidly.

It thrives not only in fresh water, but will tolerate salt water as high as one-third sea strength. This plant makes a solid mat several feet thick and grows in water up to nine feet deep. It could destroy a high percentage of our estuarine zone.

The problems of the estuarine zone are many and very complex. In order to save what we have, and possibly recover some of that which has been lost, we will need:

1. Funds
2. Enforcement
3. Research

We were killing most of the mosquitos, but in every brood, there were a few that could withstand the effects of DDT. By spraying time after time, we soon eliminated the susceptible ones, and through the process of selecting those that could withstand the effects of DDT, we created a strain of mosquitos that we could not kill.

This is what we know today as resistance. We did not create resistance; we merely selected those that were resistant.

Because of this failure and the widespread use of DDT, which is a very persistent material, mosquito control acquired a reputation that will long be remembered by, particularly, conservationists.

However, the picture is altogether different now. The Florida State Board of Health was able to promote legislation which provided funds for research and permanent control work, and most of the marshes have been altered by either diking or ditching.

One method we have of sampling the density of mosquitos is what we call a light trap. This apparatus consists of a light that attracts mosquitos, and a fan that traps them in a jar.

Fifteen years ago, we used to catch more mosquitos in one night than we do now in a whole year. And contrary to what you might think, this tremendous reduction is due almost entirely to our permanent control work, and not to the use of insecticide.

We still do a tremendous amount of adulticiding, but we no longer use persistent compounds like DDT. The larvicide we use is mostly Paris green, and it is very selective.

I have never seen anything killed by Paris green, other than mosquito larvae.

Where we used to plaster the entire marsh with DDT, simply because we did not have suitable means of inspecting the huge marshes to fine exactly where the breeding was located, we now use helicopters to pinpoint the breeding.

We seldom treat a breeding area as large as this room. Most of our larviciding in Brevard County is confined to holes about the size of a desk.

I am pleased that consideration is being given to the estuarine zone per se. We were afraid that the glamour of oceanography would focus all attention in other areas.

Who wants to splash around in muddy water and wade through mangrove marshes when he could be diving in beautiful clear, blue waters?

The first two are self-explanatory, and that leaves the one thing that is really the most important of all -- research. Thank you.

At this time, I would like to present to you Dr. Provost.

MR. TRAINA: Before you leave, are there any questions?

DR. NICHOLSOM: Are you controlling sand flies as well as mosquitos?

MR. SALMELA: In some areas of Florida sand flies are a problem and the State Board of Health has recently come out with recommendations to kill the larvae.

As a rule, most of the districts in Florida do not try to control sand flies. Whether this larvacide program will be effective, on account of the high dosage it requires, I don't know.

DR. NICHOLSOM: What chemicals are you using for sand-fly control?

MR. SALMELA: Right now the State Board of Health is recommending a creosote emulsion to be sprayed only on the inner tidal zone, that edge of the water where the water goes up and down, and that's for larval control.

Of course, you can kill adult flies that are in Flight, but that is not very effective.

DR. NICHOLSOM: Do you have any idea of the total acreage in the state treated with creosote for the control of sand-fly larvae?

MR. SALMELA: Very little now. I don't know of any. Dr. Provost could probably answer that better than I could.

DR. MAURICE PROVOST: Zero, as far as I know.

DR. NICHOLSOM: As far as I know, there has been none done on a practical basis, only an experimental basis.

MR. TRAINA: Thank you. Dr. Provost, do you have some comments?

DR. PROVOST: The Florida Anti-Mosquito Association is under the administration of the Bureau of Entomology of the Florida State Board of Health.

Therefore, I speak also for the Bureau of Entomology of the Florida State Board of Health. My statement is brief, and it is probably mostly of historical interest.

The Florida State Board of Health's concern for possible pollution injury of estuarines through mosquito control is clear from this statement I published 20 years ago:

"One of the reasons why America is great is that this is one country where almost anything can be done -- for a price.

"But the real price is too often something far more valuable than money: the natural resources which are the one and only God-given, material inheritance of generations unborn.

"The price of too many industrial and community expansions in Florida has been pollution of waters of great importance to industries and communities.

"Here is the goose and here is the egg. In like manner, the price of mosquito control can be the pollution of both land and water, for insecticides used excessively are, in every sense of the word, pollution.

"Thinking people, while granting that mosquitos are undersirable, will also see beyound the mosquitos. They will realize that the infinitely intricate pattern of soil, water, plant and animal which is man's non-man environment on earth has values which dwart on a grandiose scale the mere elimination of mosquitos.

"Therefore, they can adopt but one logical attitude towards mosquito control: It is desirable, and, yet, in the perspective of value and time, it must be practiced with utmost care." (Florida Health Notes 40 (2): 103; May 1948).

Florida was fortunate. Within a year, to the month, of this warning, the first evidence in the world of mosquito resistance to DDT appeared -- in the salt-marsh mosquitos of Brevard County.

The mosquito control districts of Florida then went from one insecticide to another -- all the time, expanding their use on the salt marsh.

At its November 18, 1951 meeting, the State Board of Health adopted a policy on mosquito control which ended with this paragraph:

"The State Board of Health feels that the trend toward ever more chemical control must be stopped. Rather than be just passive and obstructive about it, they would prefer that the state encourage permanent mosquito control.

"The Legislature should consider a bill appropriating 'State Aid' moneys, or make the funds available in the State Board of Health budget, to be expended solely on this type of control.

"It is proposed that the state make available to any mosquito control district, or Board of County Commissioners assessing a millage for mosquito control, a sum, equal to 75 percent of district-raised tax moneys, to be expended only on well-planned and well-engineered permanent mosquito control projects.

"This would be in addition to the State Aid Program already in operation. In such a plan lies Florida's only hope of ridding itself of its mosquito problems.

"The type of mosquito control practiced generally in Florida today is costing millions of dollars. People calling for more of it simply do not realize that after 50 more years and $100,000,000 more of it, there will be as many mosquitos in Florida as there are today."

The Legislature of 1953 implemented this proposal, and the State Board of Health at once issued its recommendation that no organic insecticide ever be used on the salt marsh -- a recommendation that stands to this day.

For over 20 years, as spokesman for reserach in the Bureau of Entomology and with the encouragement of its director through all these years, Mr. John A. Mulrennan, I have participated in countless committee meetings, conferences and symposia where problems of reconciling mosquito control practices and the conservation of natural resources were involved.

In more recent years, my main concern in this connection has been the possibility of deleterious effects on estuarine life of such salt-marsh mosquito control practies as impounding, ditching and so on.

In 1961, we initiated a three-year study of bird responses to salt-marsh impounding, under a contract with the U. S. Fish and Wildlife Service. Our research center, however, does not have the resources or capabilities to undertake studies of the effects of impoundment or ditching on fish, shrimp, crabs, oysters and so on; therefore, I have striven at every opportunity to get such urgently needed research performed by only institutions.

While this may seem unrelated to pollution, may I end my remarks with the assertion that these and other permanent mosquito control practices are all that prevent Florida from having either insecticide pollution of estuaries or the salt-marsh mosquito hordes which, until two decades ago, made the state a winter tourist area only, and most of the state's coastal areas uninhabitable year-round by either residents or retirees or space agencies. Thank you.

MR. TRAINA: Thank you, Doctor. Are there any questions?

DR. NICHOLSON: Dr. Provost and his group are to be complimented on this effort to keep Florida estuaries free from insecticides.

MR. TRAINA: I would next like to call on Dr. Walter A. Glooschenko from the Department of Oceanography, Florida State University, Tallahassee, Florida.

DR. WALTER A. GLOOSCHENKO: Mr. Chairman, I'm the Assistant Professor of the Department of Oceanography at Florida State University.

In terms of marine or estuarine pollution, the following schedule illustrates the main forms and sources of pollution:

1. Domestic (Household)
    a. organic wastes
    b. detergents
    c. watercraft wastes
2. Industrial
    a. pulp and paper industries
    b. Oil pollution
    c. metal industries (Not in Florida yet)
    d. thermal pollution
    e. nuclear reactor wastes
3. Agricultural
    a. fertilizers (inorganic)
    b. pesticides, herbicides, insecticides and fungicides

Domestic sources of pollution are being reduced with improved sewage treatment and the development of biodegradable detergents. However, even though solid wastes are removed from water, nitrogen and phosphorous may be added to waters.

This has caused undersirable forms of phytoplankton to occur in Long Island Sound causing declines in oyster yields in the region.

Also, another thing in Long Island Sound has been that nitrogen and phosphorous from duck farms have contributed to this.

In terms of industrial pollution, paper and pulp production is a most serious potential Florida problem. Both the sulfite and sulfate digestion processes used by this industry can remove oxygen from water, while the latter process can add toxic sulfur substances into an estuarine environment.

A less important source of pollution from this industry would be addition of wood fibers to estuaries which can coat the bottom of the estuary, seriously affecting bottom dwellers.

Suspended fibers reduce light penetration, reducing the amount of organic production by algae, hence 0_2 production.

Oil pollution is localized, and recently in the St. Marks' estuary, some bad spills have occurred. Visualize the effect of massive spills upon a Miami tourist beach.

Oil pollution can also be a serious threat to water birds and shellfish. Thermal pollution, or addition of heat to estuaries, can be from several sources, including industrial cooling, nuclear reactor, or water running entrapped behind dams, or in rivers that have been reduced in speed, due to dams.

This can be harmful to organisms requiring low temperature water or to species at thermal limit. Besides thermal pollution, nuclear reactors replace radioisotopes into rivers and estuaries, and could cause health problems, since some health experts believe that even the lowest level of radioisotope addition could be dangerous.

Agricultural pollution includes fertilizer additions, which can lead to undesirable algae forms and pesticides, insecticides, herbicides and fungicide additions, all of which can present a serious health problem to marine life, birds and man.

Several examples of declining reproduction in birds due to pesticides have been shown lately, including Bermuda petrels, the golden eagle and peregrine falcon.

The decline of populations of some of these predators could lead to infestation of insect pest, and increased biocide usage.

Another form of pollution to a fresh or brackish water environment not normally considered as such is that of salt water intrusion. Recently such an intrusion has occurred in the Everglades estuaries due to lowering of water levels into the region.

As mentioned yesterday, these estuaries are important to the life cycle of the pink shrimp which require low salinity environments for part of their life. Increased salinity could cause damage to estuarine species requiring low salinity during certain periods of their life.

Sudden changes of temperature, salinity and dissolved oxygen can cause mass mortalities of estuarine life, and have done so in the Gulf region.

However, a change in salinity could be beneficial. Fresh water from Lake Okeechobee has been released at times to the St. Lucie estuary. If this release coincides with breeding of such species are anchovies, mullet and menhaden, a greater abundance of young of such species has been noticed

However, fresh water release to estuaries at the wrong time has caused large kills of young spiney lobsters in regions. One must study the effects of pollutants on entire ecosystems and under varying environment conditions, that is, climate, river changes, et cetera, and also in terms of simple things as weed control -- things like copper sulphate and sulphuric acid -- even in the case of various biocides, one may see, at times, benefical responses such as the control of undersirable forms of crabs and certain snail perdators of oysters.

DDT has been found to prevent setting of barnacles which compete with young oysters. One must be careful of such studies. This is not to say that one should add DDT to an estuary without examining its effect upon the entire ecosystem or without studying possible side effects which could take place under varying enviornmental conditions.

Careful application, for example, as low a concentration as 0.05 parts per million of DDT has been found to kill up 90 percent of oyster larvae in a 14 day period.

Also, different species have different tolerances to various biocides. Brown and pink shrimp are extremely sensitive to such biocides as endrin, heptachlor and lindane.

Levels as low as 0.3 parts per billion have been noted to kill up to half of adult commercial-size shrimp. Virtually every foreign chemical substance must be viewed as a pollutant.

We cannot afford to repeat problems that occurred due to pulp wastes on the Fenholloway River, and pesticides on the Indian River estuary.

I suggest the possibility of licensing persons to use pesticides, as we do in radioisotopes on a state level.

Research must therefore be performed on estuarine pollution, and the oceanographer, whether his specialty is physcial, chemical, biological or geological oceanography can contribute.

Well, in terms of research needs, -- I would like to present a few here. First of all, various physical aspects of estuaries need to be investigated in terms of pollution research.

These include patterns of flushing, circulation, vertical mixing, light absorption, current directions and velocities and salinity distribution.

Such studies need to be carried out in the field, under carefully-controlled laboratory conditions, and by the use of physcial and mathematical models, such studies would lead to where and what time should a possible pollutant be added to an estuary for safest dispersal, what quantity should be added per unit of time, and how the pollutant will be dispersed when it reaches the ocean.

Now, as far as chemical studies, Florida, especially in the northern Gulf, is an ideal place for such studies due to lack of pollution. Thus, the region would be a good baseline to determine what future problems could take place.

In the realm of chemical studies, several things should be investigated, including types of pollutants and their behavior in water of varying salinities, the nature of complex industrial wastes, the release of pollutants from or retention of pollutants, in estuarine sediments.

Also, trace metal studies in Florida estuarines should be made, since future industrial development could add toxic levels of certain metals, such as copper or zinc.

Again, certain levels of pollutants could actually be benefical and increase productivity in the estuarine or near-shore environment. These may include phosphate (from either phosphate mining and sewage decomposition), nitrogen (from sewage) and certain metals, such as iron, manganese and copper.

However, beyond certain levels, growth of undersirable forms of algae could be stimulated, or toxicity problems develop. Base levels must be determined of biologically active elements so that pollution effects may be evaluted before certain types of industry become developed.

Next is biological reserach. Unfortunately, little is known about the biology of commerically important species, such as shrimp and oysters.

Basic studies need to be carried out in such areas as nutrition, genetics, phyciology, reproduction and morphology in order to determine pollution effects and possibly develop pollution-resistant varieties, if necessary.

Work needs also to be carried out on pollution effects upon phytoplankton and zooplankton, since these are the basis of all life in aquatic environments.

These minute forms of life are able to concentrate pollutants and transfer them to higher forms of marine life. Little is known upon the effects of pollution upon plankton, especially the plant forms.

Biological studies need to be performed in the field and under controlled laboratory conditions on species which are suitable. Pollution indicators should also be determined.

Next we have the geological studies. Here, studies, need to be done on silting and sedimentation rates, location of sedimentation, the release of pollutants from estuarine sediments by dredging and construction of canals and factors influencing accumulation of pollutants in sediments.

Marine preserves should be established for purpose of research. These normally would include estuarine areas previously unpolluted by man. Such regions would be kept in their natural states for physical, chemcial, biological and geological studies.

If necessary, such preserves may have to be closed to all human activity, including recreational boating. Also, preserves should include some polluted regions so that research may be done to investigate changes due to pollution.

However, baseline studies to typical Florida esturaines need to be done first in order to characterize such areas before they might come polluted, and to prepare for future industrial development which may pose possible pollution hazards.

Accidental pollution due to such factors as shipwrecks, accidental dumping of biocides and oil spills have, and will occur in the future.

Reserach studies should be performed in these cases as soon as possible in order to evaluate potential hazards to marine life or human health. However, base studies, again, are needed, since it is of little value to determine environmental changes, unless the original environment was well characterized.

Also, trained personnel must be available to do estuarine and pollution research. The Department of Oceanography is best qualified to train such personnel, since a proper study of estuarine pollution involves physical, biological, chemical and geological research.

Oceanography has been traditionally a multidisciplinary field embracing those four areas of research. However, training in oceanography may have to be supplemented with limnology, the study of fresh water environments, such as rivers and lakes, since an estuary is a region where fresh water meets salt water.

Florida State University's Department of Oceanography can provide both the teaching facilities to train future estuarine-oriented scientists; and can perform the necessary research into the physical, chemical, biological and geological parameters of the estuarine environment as related to pollution problems. Thank you.

MR. THOMAN: Thank you, Dr. Glooschenko, for an extremely articulate and effective summary. We will see that your entire statement is incorporated in the record.

I would next like to call on Mr. Robert Haynes, President of the Ridge Audubon Society of Lake Wales.

MR. ROBERT M. HAYNES: Members of the panel, ladies and gentlemen: I have a difficult assignment in following such an erudite speaker as we just had, and I realize my limitations in that regard.

I am Robert M. Haynes, President of the Ridge Audubon Society of Lake Wales, a chapter of the Florida Audubon Society.

Our principal interest as an organization is conservation of natural resources which we are well aware are in considerable jeopardy. Already, many priceless areas have been lost in the name of progress and despite massive efforts by interested groups like ourselves, enormous pollution of air and water still continues.

There seems to be a reluctance on the part of many local, state and federal authorities to take the decisive steps needed to regulate and enforce existing laws covering use of our air and water to prevent further despoiling of our environment.

Our concern here today is with the vital estuarine areas with which Florida's extensive coastling abounds. As a state, we have much to save or much to lose.

Our heritage in this respect is unparalleled. In the past, man has done much to destroy or damage these natural areas, because he has had the technical know-how and machinery to be highly destructive.

After decades, we are finally becoming wise enough to see the necessity of retaining and enhancing natural areas, rather than destroying them. Correction of past mistakes is very costly, but necessary, although the wisest and cheapest course is not to distroy in the first place.

How in the world can we go on with the pattern of action pursued in the past, which is economically, morally and inexcuseably stupid?

We have an obligation to future generations. Commercial fishing interests, sportsmen, the Izaak Walton League and others have long been aware that estuaries are the spawning grounds of vital food chains for human, as well as animals, in a world which is mushrooming in population.

Scientific study of the consequences present action so clearly reveals its folly. Progress should mean, but most often does not, advancement through intelligent use, without abuse, of our natural areas, while providing for their preservation for future generations.

There are experts in this field, and they should be hired and their advice taken as to proper care and use of estuarine areas for maximum protection and restoration where needed.

Pollution should be stopped at its source with the cost borne by the pollutor, not the public.

If any industry is privileged to use the water of a river or stream, it should be with the clear provision that after its use, it shall be returned to the river at least as pure, in all respects, as it was when taken from the river.

Examples are multiple in which industry, when forced by act of law to curb abuses of natural resources, has found a way to eliminate the difficulty in the public interest.

No one has the right to foul the waters of our lakes and streams which are a part of the public domain. Whether pollution is biologic, chemical, thermal or by radiation or silting, such as occurs by bulkheading, we all suffer the consequences of such action with the resultant undermining of the nation's resources.

Let us examine our laws and prepare new ones where necessary to protect our waters, and let us also have the courage to enforce them, regardless of whose toes are stepped upon, so that the public interest now and the interests of generations to come will truly be represented.

Thank you for the privilege of making this presentation.

MR. TRAINA: Thank you, Mr. Haynes.

I would next like to call on Mr. Hetrick of the Florida Entomological Society.

MR. L. A. HETRICK: Mr. Chairman, in addition to being the current President of the Florida Entomological Society, I am a professor of entomology at the University of Florida.

I want you to know that the Florida Entomogical Society is concerned about the mounting and continuing problems of pollution. Concern is expressed for increasing contamination of estuary waters, as well as all other waters, soil, air and all components of man's environment.

With an expanding human population, some contamination of the environment is to be expected. The increased numbers of people demand more industry, additional generation of electric power, more pulp and paper products, greater production of minerals and expanding food and fiber production from shrinking land areas.

The proper use of various agricultural chemicals has permitted food and fiber production to keep pace with ever-increasing demands. The proper use of these chemicals will keep contamination at a minimum and without them, sufficient food production could not be accomplished.

Of course, there are accidents associated with all of man's activities, and accident frequence tends to increase with the population and its demands.

Accidents have caused, and will continue to cause, polluted estuary waters. Industrial wastes that could be controlled also pollute waters.

Industries that produce such wastes should explore other means of disposal or perhaps convert the current wastes to useful and marketable by-products.

It is unreasonable to expect that all contamination of waters can be eliminated or prevented. Some contamination is inevitable with the increasing population.

Just where to draw the line between tolerable contamination and pollution is a problem that will require study and evaluation of individual estuaries and their headwaters.

Sound biological judgments are needed in each instance. Problems of Florida estuaries are not the same as those of the Chesapeake Bay, and different approaches to solution of individual problems will have to be accomplished locally.

Services of many competent biologists will be required to evaluate, monitor and correct existing and future pollution problems and estuaries.

MR. TRAINA: Thank you, Mr. Hetrick. Is there anyone else who would like to make a statement?

MR. R. Y. PATTERSON, JR.: Yes, I would.

MR. TRAINA: Would you please identify yourself and your organization for Mr. Crites.

MR. PATTERSON: I am R. Y. Patterson, Jr., General Attorney for Florida Gas Company, Winter Park, Florida.

Mr. Chairman, I am pleased to be here today to present this brief statement. My company, in addition to providing a cure for air pollution with the use of gas, can also help solve the water pollution problem.

Pollution is pollution, whether it be in the water or air, and similar activities and materials cause each. The difference is which medium is utilized to dispose of waste -- air or water.

The State of Florida stands more to lose, economically and aesthetically, due to air and water pollution than any other state in the Union. For this reason, Florida should be the most concerned with keeping its air and its water pure.

All the familiar standard causes that are cited by those who are calling for the need for urgency in dealing with water pollution, such as growing population, growing demand for water, et cetera, apply doubly in the particular case of our own State of Florida.

A quick glance at the map shows why. Of the entire coastline of the 48 contiguous states, Florida has over 20 percent.

Florida's inland water area makes up 7.6 percent of the total area. This is four times as great as the figure for the nation as a whole and compares with the 5.7 percent of Minnesota, and self-styled "Land of Lakes."

These geographical facts, coupled with Florida's well-known higher rate of population growth, its high dependence on tourism and its large fishing and boating industry, make it obvious why water pollution control is so vital to the state.

All cities or municipalities on a particular river or lake are polluting water resources in some manner, but each city or municipality is different. Each has its own pollution problems.

Some are discharging raw sewage; some are discharging inadequately treated sewage. These effluents contain phosphates, nitrate and other nutrients which cause undue growth of algae in the receiving waters, a serious problem in central and south Florida.

Natural gas can help solve these problems. Gas-fired commercial incinerators are available and in use in many supermarkets and shopping centers. Waste material that would otherwise be disposed of through conventional sewage systems is able to be completely burned by enhancing the natural combustion with gas.

Demonstrations have been run with these units, burning rubber tires. The combustion is so complete that the exhaust air is completely clear and odorless. Thus, both air and water pollution is curbed.

Home incinerators are now available on the market, although not as generally used as the commercial installations. In the near future, with increasing attention paid to preventing pollution, such units should prove as feasible as the larger commerical types and popular with the householder.

Florida's problems, in addition to differing in magnitude to those of the national problems generally, are unique and special in many ways, and, as such, require specialized treatment best effectuated by those close to, and familiar with, the region.

For these reasons, the state and the local agencies should be given a prominent role in any management and control of water resources. Just as those people in Virginia and Oregon are more aware of their individual local situations and are better able to deal with them, so too, is Florida.

In 1967, the Florida Legislature created the Florida Air and Water Pollution Control Act. The purpose of this act is to conserve the waters of the state and to protect, maintain and improve the quality of public water supplies for the propagation of fish and wildlife and for all beneficial uses.

I feel the state should be given a chance to make its program work, and in the event the state's resources are too limited, then a working arrangement between the state and the federal agencies could be set up.

However, I believe that for Washington to preempt the field entirely as has happened in other cases historically, would be a mistake and should only be done as a last resort if the state proves itself wholly inadequate to carry out the job.

To be sure, there is a need for overall cooperation and coordination, so as to prevent duplication and wasted effort, but the bulk of the work should be done by those familiar with, and close to, the causes and the problems.

I would like to let the record show that I appreciate Governor Kirk and Mr. Reed for placing my name on the invitation list to appear here at this hearing. Thank you very much, Mr. Chairman.

MR. TRAINA: Thank you, Mr. Patterson.

I have here that Mr. Robert O'Brien of Rollins College would like to make a statement. Mr. O'Brien.

MR. ROBERT E. O'BRIEN: I would like to, Mr. Chairman, if I can, just make a statement on my own before I read a prepared statement by the President of our college.

MR. TRAINA: Fine.

MR. O'BRIEN: I am Coordinator of the new science center and Associate Professor of Biology at Rollins College. I might mention that I was extremely happy to see Dr. Nicholson here, whom I had worked for indirectly on my graduate work for two years.

I am very happy to see this type of meeting being held here in the State of Florida. I, for one, in addition to many of my colleagues, directly or indirectly, have supported varied programs dealing with specific studies that affect the changing ecology in the natural resources that we have here in the State of Florida.

This has been more specifically related to changes in fresh-water ecology. I do think that the FWPCA and other appropriate agencies should be dutifully recognized for their efforts and for their work toward solving the basic problems that are at hand.

I would like to reiterate one statement that I think is extremely important, that the doctor from Florida State discussed, and this is education of our youth.

I think this is one of the major problems in this one area, not only in some our organizations, such as the Scouts, and this type of organization, but in the schools themselves.

I refer to, again, ecology and conservation of natural resources. I think this could be strengthened as they move through their regulated school years.

I will now read a prepared statement by President Hugh F. McKean.

Florida is a great state. Its economy is strong. Its schools and colleges are good. But its furture is threatened because its rivers, estuaries, lakes and coastal waterways are being polluted.

The state, in effect, is being robbed -- but not by thieves or villians. It is being done by some of the most enthusiastic Floridians -- its "developers," who want to make a quick dollar and move on. The real villians are the rest of us who are letting this happen.

My sympathies are with those trying to stop the industrial and municipal waste pouring into the rivers, the sewage going into the sea, the fertilizers and all other kinds of wastes flowing into the lakes and into the underground rivers.

They are trying to save more than the fish, the birds, the alligators and all the rest of Florida's wildlife which is being threatened. They are trying to save more than the beauty of the Indian River, the Banana River, the St. Johns River and all the other bodies of water which lie in and around Florida.

They are trying to save the balance and the ancient order which has made Florida a near paradise and a source of vast physical wealth for millions of Americans.

But their undertaking is a big one, and they could easily lose. The "developers" and the exploiters are organized. Their motives are powerful. The rewards they seek are tangible.

The rest of us see the yellow water, the tangle of weeds around the shores of the lakes, the white bellies of dead fish and the newspaper pictures of the poachers.

We shake our heads and utter an angry word and then turn our minds to something more "pleasant."

Unfortunately, there seems to be a pattern which is being followed once again. We have to make such a shambles of our environment that the hotels stand empty, the waters become yellow and stagnant, the air too foul to breathe, before enough people see the folly of contaminating the environment, before we can expect any real action.

When it is too late, and everyone sees what a few saw decades earlier, there are shrill demands for tax moneys from the state and federal governments.

Millions of dollars then need to be spent trying to bring back only a suggestion of the beauty, the order, and the prosperity which everyone assumed would last forever in spite of man's stupidity.

There is one bright side to the picture. Millions of Floridians know the dangers and the costs of upsetting the balance of nature which has made this beautiful state.

If they will only speak, the beauty, the order and the economy of Florida could be saved. Thank you for this opportunity.

MR. TRAINA: Thank you, Mr. O'Brien. These are all the names we have here. Is there anyone that would like to be heard that has not been heard?

Mr. Patton, do you have any comments?

MR. PATTON: Yes, I would like to make a few comments. We have heard quite a number of words, statements by many individuals from all walks of life across Florida.

Contrary to what some may say about nothing being done, I think there has been a battle going on for a long time. You may question whether it has been a battle that has been without adequate funding or not.

I think that, in the long run, the people decide how much money they want to put into any program. I think the action of the Legislature in passing the new law, which became effective on September 1 of last year, indicated that they were concerned.

I think, in turn, the action of the Commission at its meeting since that time, in authorizing citations which went to various cities, subdivisions and industries, has indicated the Commission's concern in their attempt to get something moving.

The Commission is aware that there are many forms of pollution. I think these have been enumerated. There is no point in my going over this list again.

However, I think that this is not a job we are going to do tomorrow, regardless of how much effort we are able to expend.

I think the amount of money that is put into the program is limited at the various levels. We are limited by the amount of available manpower.

I was very happy to here some of the speakers indicate that they are concerned with trying to increase the amount to available trained manpower.

I think that we have to beware of research for research's sake. Sometimes this can turn out to be a rather delaying task, particularly which does not serve the purpose of pollution control.

I think that we have to be aware of the cost. One speaker, I know, made the statement about the cost per person served by a system would not be too great.

But I think that we have to try to be economical in this program. We are asking the taxpayer to spend a certain amount of money for this program. They want to spend certain amounts of money for another program, and when you add all the programs together -- after a while, if you're not careful, this can get to be a burden even which taxpayers will not accept in the long run.

So I think that we have to use some caution there and try to get the taxpayer as much as we can for his money. Thank you.

MR. THOMAN: Thank you, Vince. For those few hardy souls that are left, thank you.

Do you wish to submit a statement for the record?

MR. SAMUEL T. DREW: My name was on the list. I am Samuel T. Drew, Sanitary Engineer, Rader and Associates. Mr. Rader prepared a statement, but is unable to be here.

MR. THOMAN: Would you like to present it, please?

MR. DREW: It won't take but a couple of minutes.

"Dear Mr. Thoman: I appreciate very much your invitation to make a statement at your National Estuarine Pollution Study Meeting, to be held in Orlando, Florida, on March 12 - 13, 1968.

"This very important matter of cleaning up our coastal waters and rivers is of the utmost concern to the State of Florida because of its long coastline.

"Since you ask for my statement to consider the role and relationship of federal, state and local agencies, it would seem to me that the logical approach would be for the Florida State Board of Health to administer the program in Florida, under the direction of the Federal Water Pollution Control Administration.

"As it is believed that the Florida State Board of Health would not have sufficient personnel and equipment to make a detailed study of pollution in the coastal waters of Florida, it should be empowered to hire competent Florida consulting engineering firms to make the studies and prepare reports on the various sections of our coastline.

"The Florida State Board of Health would then coordinate these studies with your Administration. It is assumed that federal funds would be made available for the study.

"Certainly, the Number 1 problem is to eliminate sewage that is now being dumped into our coastal estuaries, bays, rivers, and the like, and a considerable amount of study will have to be made to determine just how much work will be involved and what the cost will be to eliminate this pollution.

"Some of the cities have installed sewage treatment plants, which reduces the amount of pollution, but these plants are far from being adequate.

"Take, for example, the City of Miami, which, for many years, dumped its sewage into Biscayne Bay.

"Some 12 years ago, complete sewage treatment plant was put into operations, which handled the bulk of the sewage for said city; however, there are 27 other municipalities in the Miami area which have meager, if any, sewage treatment facilities.

"Therefore, the waters of Biscayne Bay, the Miami River, Little River, Snake Creek and other tributary streams continue to be polluted.

"Naturally, the most important consideration is that of health; but it must be realized also, since Florida is a year-round tourist state, our coastal waters are used extensively for recreation purposes, such as swimming, boating, water skiing, fishing and the like.

"These waters also provide breeding grounds and feeding areas for fish and other types of seafood.

"We must not lose sight of the importance of these coastal waters in Florida for shipping. Some of the more important seaports of the United States are located on the Florida coast, and a method should be devised for keeping ships, yachts and other craft from dumping waste materials into our inland waters.

"Oftentimes, ships pump their bilges, and the bilge water brings with it oil and other objectionable materials, detrimental to most, if not all, of the uses to which we put these waters.

"As more and more atomic power plants are built along our coastline, safeguards should be made to insure that there will be no atomic pollution and that thethermal water discharged from such plants does not change adversely the uses for these coastal waters.

"On behalf of my firm, Rader and Associates, Engineers and Architects, we offer to be of any service possible in the carrying out of this National Estuarine Pollution Study.

"Yours very truly, Earle Mr. Rader, Consulting Engineer."

MR. THOMAN: Thank you very much, Mr. Drew. We certainly do appreciate it, and I'm sorry we didn't get you on before.

With that, I want to thank everyone who participated in and attended these meetings. I think it has been a very successful one, and again, thanks to all of you.

The meeting is officially adjourned.

(Whereupon the meeting adjourned at 4:35 o'clock p.m.)

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